JUNE 1960

Traffic Safety

A NATIONAL SAFETY COUNCIL PUBLICATION

NOW IT'S .10 IN NEW YORK

Gov. Rockefeller spells out new impairment law

WHAT'S AHEAD FOR THE AGING DRIVER?

GRADES AND GASOLINE — A School Problem

See Research Review

ON THE ROAD TO SAFETY WITH...

AFE DRIVERS
Read and heed
YIELD
RIGHT OF WAY
Sometimes even this is TOO FAST!
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RAIL ROAD CROSSING
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DON'T CROWD YOUR LUCK
Follow at a SAFE distance
DANGER LURKS AT BLIND CORNERS
DRIVING PROBLEMS - BIG OR SMALL
KEEP YOUR EYES ON OUR PUPILS
DEMAND ATTENTION - CHECK 'EM ALL
SIX or SIXTY
Look out for us — we may not be looking for you.
Courtesy
IS A GIFT YOU CAN GIVE ALL YEAR LONG
DEFENSIVE DRIVING
A Good Thing to Keep in Mir

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HARLEY-DAVIDSON

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Circle Item No. 1—Reader Service Card

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for smaller schools

Mobile Drivotrainer brings better driver education at lower cost per pupil

to schools graduating under 150

Now it is possible to extend to high schools graduating *less than 150* students the same high level of driver education afforded larger schools equipped with the Aetna Drivotrainer classroom system—and at the same savings in teachers, time, and teachers' time!

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Rockwell extends service to schools by manufacturing and distributing the Drivotrainer system which was developed as a public service by the Aetna Casualty and Surety Company. Working closely with a panel of nationally known educators, Aetna invested considerable time, effort and funds in perfecting the Drivotrainer system. With its effectiveness fully documented by responsible educators, the Drivotrainer is in use in schools, as well as in driver re-training programs.

Rockwell will continue to provide the same quality of product and of service which has won for Delta Power Tools a place in 72% of U.S. school shops, and that has made Rockwell measurement and control instruments the standards of quality in their fields. For further information on the Drivotrainer and Deferred Sales Plan, write: Rockwell Manufacturing Company, AVM Division, Dept. 407F, Pittsburgh 8, Pa.

DRIVOTRAINER

another fine product by

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Circle Item No. 2—Reader Service Card

THE SAFETY LIBRARY

By Lois Zearing, Librarian, NSC

Accidents

Accident Study in Wyoming. *Better Roads*. March, 1960. p. 32-33.

(Accident study on the national interstate highway system within the state. The study revealed that accident rates were 45 per cent lower and fatal accident rates on the expressways were 81 per cent lower after construction.)

Application of Statistical Control Techniques in Determining Above Normal Accident Risk Sections on the Arizona State Highway System. August, 1959. 12pp. Processed. Arizona Highway Department, Phoenix, Ariz.

Cost of Passenger Car Accidents to Utah Motorists in 1955. 1959. State Road Commission of Utah, Research Department, 525 West 13th, South, Salt Lake City 15, Utah.

(A detailed study presented in charts.)

A Report on Safety Belts to the California Legislature: Summary and Analysis of California Highway Patrol Reports and Opinions on 54,348 Automobile Accidents. Boris Tourin and John W. Garrett. February, 1960. 16pp. Processed. Automotive Crash Injury Research of Cornell University, 316 East 61st St., New York 21, N. Y.

(Results of a joint study by the California Highway Patrol and Automotive Crash Injury Research of Cornell University.)

Utah Reports on Damaged Vehicles. Lyle Hyatt. *Traffic Digest and Review*. March, 1960. p. 6-8.

(A windshield sticker has improved accident reporting in the state and aided the apprehension of hit-and-run drivers.)

Alcohol

Chemical Tests versus the Drinking Driver. *Journal of the American Medical Association*. February 27, 1960. p. 109-935.

(Gives the Arizona standards for judging drinking by drivers.)

New Jersey Bartenders Issue "Drinking Cards." *Pacific Northwest Law Enforcement News*. January-February, 1960. p. 36-37.

(These cards are designed to give drinkers an indication of when they have had enough. The cards contain a chart showing how much alcohol gets into the blood when a person of a given weight takes a specific number of drinks.)

Carbon Monoxide

A Study of the Relationship of Street Level Carbon Monoxide Concentrations to Traffic Accidents. George D. Clayton and others. *American Industrial Hygiene Association Journal*. February, 1960. p. 46-54.

Commercial Vehicles

Add Truck Cabs to Your P.M. Program. *Motor Truck & Coach*. February, 1960. p. 30-31, 34-35.

(Importance of a good truck cab to driving operations.)

Fatal LP-Gas Tank Truck Fire. Clark F. Jones. Reprinted from October, 1959 *NFPA Quarterly*. 11pp. National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass. Price 25c.

A Safety Plan for Small Truck Fleets. I. F. MacKenzie. *Motor Truck & Coach*. February, 1960. p. 36.

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How Fleet Operators SAVE 3 WAYS with

Beam's AUTO SAFETY BELTS

New low factory-to-you prices on belts for company cars and employees' personal cars . . .

Now you can reduce the high cost of auto accidents — with Beam's Auto Safety Belts!

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13th and North Robinson Oklahoma City, Okla.

Traffic Safety

Volume 56 Number 6 June 1960

A NATIONAL SAFETY COUNCIL PUBLICATION

TRAFFIC SAFETY is dedicated to the prevention of traffic accidents through the presentation of objective information and responsible opinion to official agencies, public support groups and the motor transportation industry. The views expressed do not necessarily reflect the beliefs or policies of the National Safety Council, but they are presented in the conviction that the pressing social problem of traffic accidents can best be resolved through freedom of expression and open debate.

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BETWEEN STOPS

"ON A RECENT holiday weekend more than 2,000 uniformed police were scattered on major routes leading from the city to pleasure spots on the coast. Police helicopters whirled overhead, police in civilian dress drove unmarked cars, motorcycle police lurked behind trees and speed traps were generously scattered, many of them placed along tempting straight-aways."

Sounds like traffic control in the United States. It isn't. It's an account of a holiday weekend in France.

Postwar prosperity in Western Europe has resulted in traffic jams and accident and death tolls that rival and surpass those in the United States.

They say that misery loves company. So, perhaps we can take some sort of melancholy pleasure in seeing others suffer from the same highway disease that plagues us. And then there is this happy thought—with more and more nations afflicted with traffic ills, there should be more and more doctors working toward the cure.

DEATH TOLL PLUNGES IN MARCH

Drop of 16 per cent brings lowest toll since 1949

by H. Gene Miller

MOTOR vehicle deaths in March took the sharpest drop since early in 1947, as they plunged 16 per cent below the March count of the previous year. The total of 2,400 deaths was the lowest since 1949 when 2,149 persons died.

To what extent snows in March may have contributed to the sharp drop is not known, but if this was a factor, it would not seem to be the only one since decreases were recorded in every region of the entire country.

The evidence indicates strongly that stepped-up program activities—better enforcement, better education, better driving practices, better roads—may be offsetting increases in the numbers of drivers, cars and miles of travel.

The sharp drop in March brought the three-month total down to 7,680, nearly 5 per cent under the total for the first quarter of 1959.

Figures on travel are not available for March, so the influence of travel on the March decrease in deaths cannot be determined at this time. At the end of February both deaths and travel were up slightly over the previous year. The death rate for two months remained at 5.0, equalling the record low for the same months of the previous year.

Disabling injuries during the first three months of the year are estimated at about 300,000. These are injuries resulting in disability beyond the day of the accident and do not include minor injuries which undoubtedly total hundreds of thousands more.

Among 49 states reporting March experience, 37 had fewer deaths than last March and 12 had increases. This was the largest number of decreases for any month on record.

For three months, 33 states showed decreases, one reported no change, and 15 had increases.

Paralleling the national experience, cities registered a substantial 14 per cent decrease in March, according to reports from 720 cities over 10,000 population. For three months, these cities showed a 3 per cent decrease from last year.

Cities with fewer deaths in March totalled 128, compared with 110 having more deaths, 482 showed no change (mostly perfect records).

For three months, 192 had decreases while 200 had increases, with 328 showing no change.

In March, 546 of the 720 cities reporting had perfect records. Of these, the three largest were: Toledo, Ohio (343,700), Miami, Fla. (259,000), and Wichita, Kan. (224,700).

For three months 393 of the cities still had perfect records. Of these the three largest were: Grand Rapids, Mich. (212,300), Hartford, Conn. (187,300), and Trenton, N. J. (128,000).

The leading cities in each popula-

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H. Gene Miller is director of the National Safety Council's research and statistics department.

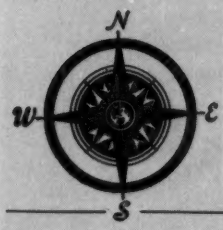
Leading at the End of March

States

New Hampshire	— 58%	Virginia	— 18%		
Wyoming	— 41%	North Carolina	— 16%		
Idaho	— 34%	Arizona	— 15%		
Rhode Island	— 32%	Maine	— 14%		
Iowa	— 31%	New York	— 12%		
West Virginia	— 31%	Alabama	— 11%		
Nebraska	— 25%	Kentucky	— 10%		
Alaska	— 25%	Illinois	— 7%		
Kansas	— 24%	New Jersey	— 7%		
Vermont	— 24%	Massachusetts	— 6%		
Oregon	— 23%	Montana	— 6%		
Pennsylvania	— 21%	California	— 5%		
Oklahoma	— 21%	New Mexico	— 5%		
Texas	— 20%	Minnesota	— 4%		
North Dakota	— 20%	Maryland	— 4%		
Nevada	— 20%	Arkansas	— 3%		
South Dakota	— 19%				

Cities

Grand Rapids, Mich.	—100%	New York, N. Y.	— 32%
Miami, Fla.	— 82%	San Diego, Calif.	— 30%
El Paso, Tex.	— 81%	Ft. Worth, Tex.	— 27%
Omaha, Neb.	— 57%	Portland, Ore.	— 25%
Birmingham, Ala.	— 54%	Worcester, Mass.	— 25%
Toledo, Ohio	— 50%	Chicago, Ill.	— 22%
Atlanta, Ga.	— 44%	Louisville, Ky.	— 21%
St. Louis, Mo.	— 42%	Milwaukee, Wis.	— 15%
Buffalo, N. Y.	— 40%	Denver, Colo.	— 8%
Oakland, Calif.	— 40%	Honolulu, Hawaii	— 8%
Houston, Tex.	— 39%		



Today's Traffic

Getting down to basics

The Kikusai Bus Co. of Tokyo has ordered its 33 drivers to start a two week course in Yogi style Zen meditation at a local Buddhist temple. The theory is that once they obtain the "inner light," the drivers will have peace of mind and be able to discipline any urge to speed or take chances.

News for contact users

Some drivers who have switched from glasses to contact lenses are finding that their driving permit restriction to drive "only while using proper glasses" is not being fulfilled if they drive while wearing their contacts.

Turning the tables

An Indiana state trooper, attempting to serve a warrant on a 17 year old youth for reckless driving, didn't have far to look. The boy slammed into the rear of the officers' car at a traffic light. The trooper was taken to the hospital with a severe neck sprain. The boy was lodged in the county jail.

British flout traffic laws?

It seems that Christmas is celebrated in much the same manner in Great Britain as it is in the U. S. The 1959 holiday weekend boasted the highest traffic toll in history—154 deaths, 4,852 injuries. In England and Wales alone, deaths rose from 86 in 1958 to 147 in 1959. As in this country, Christmas Eve was the deadliest day of the year. *Safety News*, official publication of the Royal Society for the Prevention of Accidents, attributes the alarming rise in casualties to a growing contempt for law.

Last state falls in line

The 1960 Maryland General Assembly has ended the state's unique lifetime permit system for motorists. A new law requires drivers to renew their operator's permits every two years, but does not require a driving test or other examination.

Safer on foot

Latest casualty in the miniature vehicle accident category is a Pasadena executive's wife who suffered a severe back injury as a golf cart overturned on her at a country club. The victim was seated in the motor-driven cart when she accidentally stepped on the accelerator. The vehicle rolled down a hill and tipped over.

Governor Rockefeller signs bill to curb the drinking driver, while the bill's sponsors, Senator Edward J. Speno and Assemblyman Leo P. Noonan, look on.

NOW IT'S .10 IN NEW YORK

New law sets .10 per cent blood alcohol as presumption of impairment

by Gov. Nelson A. Rockefeller

AT its last session, the New York State Legislature, at my request, enacted what many of us consider to be pioneering legislation designed to deter and discourage that most problematic of all problem drivers—the fellow who drinks and then drives. For too long the importance of the drinking driver in our traffic safety problem has been grossly underestimated, but highly credible research has shown that alcohol is a possible factor in a surprisingly and disturbingly high percentage of serious accidents.

New York State's new law, which will take effect on October 1, 1960, creates a new traffic infraction prohibiting driving while one's ability is impaired by the consumption of alcohol. The law provides a presumption that a driver's ability to operate a motor vehicle is impaired if the driver has 0.10 per cent or more by weight of alcohol in his blood. Convictions will result in mandatory suspension of the driving privilege, with mandatory revocation for repeaters, in addition to the fines and possible jail sentences generally provided for traffic infractions in New York. This, briefly, is what our new law, which basically provides for a new intermediate charge against the drinking driver, is all about. Now here is why we think the new law was needed and how it came about in New York State.

At present casualty rates, every one of the 16,700,000 persons now living in New York State faces the statistical prospect of being a highway casualty sometime during his lifetime. More automobiles, greater travel and economic growth contribute to our highway congestion and to our accident statistics, but these factors serve only to emphasize the State's responsibility to develop means to improve our traffic safety efforts.

In the spring of 1959, I asked the state's Interdepartmental Committee on Traffic Safety, representing twelve state agencies having substantial concern for traffic safety problems, and chaired by the secretary to the governor, to develop, with the advice and cooperation of the Joint Legislative Committee on Motor Vehicles and Traffic Safety, a program to revitalize the state's traffic safety program. The creation of a new intermediate offense, based upon impairment of the ability to drive and the presumption that 0.10 per cent or more by weight of alcohol in the blood indicates such impairment, was among the measures recommended by the interdepartmental committee, and which

I recommended to the Legislature.

The sponsors of the bill in the Legislature, Senator Edward Speno and Assemblyman Leo Noonan, did yeoman work in making a case for the measure before their respective Houses. Senator Speno appeared with me on a state-wide telecast in which we explained to all New Yorkers the importance of our traffic safety program, with particular emphasis on the new concepts involved in our "impaired" bill. Initial doubt and confusion as to the terms of the bill existed, but because the bill had been pre-filed more than a month before the beginning of the 1960 legislative session, there was ample time for discussion and consideration of the measure. The bill was carried unanimously in the State Senate and with but a handful of dissents in the Assembly, surprising for a measure which changed so many of the ground rules and was without precedent in the United States.

Evidence Showed Need

That some sort of action to deter the drinking driver was needed was apparent to us here in New York. Early in 1959 our professionally staffed Driver Research Center completed a most revealing study which was published in the Journal of the American Medical Association. Using scientifically valid methodology, the researchers examined the single-vehicle fatal accident experience in suburban Westchester County during the eight years beginning January 1, 1950. On the basis of post-mortem examinations, it was determined that fully 73 per cent of the drivers killed in such accidents during that eight-year period had concentrations of alcohol in the blood by weight of 0.05 per cent or more. In other words, alcohol was a possible factor in at least three-fourths of these single-vehicle accidents.

These results have been further corroborated by analysis done by the Scientific Laboratory of the New York State Division of State Police. In analyzing blood specimens taken from a number of operators and passengers involved in fatal accidents investigated by the state police, the laboratory found still more evidence of the serious influence of alcohol in fatal accidents. In the single-vehicle accidents covered, 84 per cent, of the operators killed had alcohol levels in excess of 0.05 per cent, and 75 per cent had levels of 0.10 per cent or more. In the two-vehicle fatal accidents, almost half of the deceased operators were found to have significant amounts of alcohol in the blood at time of death. In the six instances of single-vehicle accidents in which the operators lived, five of the six surviving operators were found by the laboratory to have alcohol levels of 0.05 per cent or more.

Together, these results demonstrated the need for action and the seriousness of the threat posed by the drinking driver. Here, then, was a good example of worthwhile research pointing up the necessity for official action.

New York, like many other states, recognizes the results of chemical tests as evidence of intoxication. In fact, New York is one of the few states in which refusal to submit to chemical tests is grounds for revocation of the driving privilege. Our statutes provide that concentrations of alcohol in the blood of 0.15 per cent or more are prima facie evidence of intoxication, and concentrations of more than 0.05 per cent but less than 0.15 per cent in the blood are relevant evidence of intoxication. Conviction for driving while intoxicated constitutes a misdeamor. Our statutes on the subject seemed on their face to be sufficient and to place New York in the forefront of the states. In the application of these statutes, however, there were problems, two of which were pointed up by field experience and scientific opinion.

First, the 0.15 per cent blood alcohol reading, which results in a presumption of intoxication, had become in practice a floor for prosecution, and readings below 0.15 per cent had become generally regarded as indications of ability to operate a motor vehicle safely. Although levels of more than 0.05 per cent to less than 0.15 per cent were admissible as relevant evidence, they were generally ignored by all concerned. There is a great deal of evidence, however, that driving abilities are impaired severely in this lower range.

At a meeting of international experts held in December, 1958, at Indiana University, a select committee of doctors—convened for the purpose of summarizing the scientific evidence pertaining to this field—stated, "As a result of the material presented at this symposium, it is the opinion of this committee that a blood alcohol concentration of 0.05 per cent will definitely impair the driving ability of some individuals, and as the blood alcohol concentration increases, a progressively higher proportion of such individuals are so affected, until at a blood alcohol concentration of 0.10 per cent, all individuals are definitely impaired."

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Alcohol was a factor in three-fourths of the single-vehicle fatal accidents studied in eight-year project of New York Driver Research Center.

WHAT'S AHEAD FOR THE AGING DRIVER?

What are a driver's chances of staying on the road after he enters the upper age brackets? Good, say motor vehicle administrators, if he acknowledges the limitations imposed by advancing age and agrees to drive within them.

by Elbert Hugunin

SENIOR citizens face many difficult decisions.

For those who drive, one of the most important decisions to be made is whether to stop driving altogether or to curtail driving activities.

This decision must be made after an objective appraisal of the driver's current performance in traffic. This performance — not his chronological age — is what determines an individual's fitness to drive.

An Individual Matter

Most experienced senior drivers can retain their competence behind the wheel. This is substantiated by driver record files of state driver license administrators. If a driver has learned well, has suffered no severe disabilities, and has a good driving attitude and record, he should expect to drive to an advanced age. On the other hand, senility that interferes with safe driving can force an immediate decision regarding future driving.

Some drivers never successfully master safe driving techniques. They are a concern to state driver license administrators at any age. But some good drivers become less skillful as they advance in years. Administrators are developing an increasing interest in the contributions of senior drivers to traffic problems, especially those involved in traffic accidents and violations after years of safe driving.

Although adequate and accurate facts are not available on a national basis, special studies by some driver license administrators—California, North Carolina, and New York—and traffic accident records systems supervisors have revealed that the older driver is having too many traffic accidents of certain types. The accident involvement rate goes up with advanced age and, unfortunately, so does the severity of injuries sustained.

In view of these facts senior drivers should carefully appraise their abilities and exercise self-discipline. Either they must keep their driving abilities at a reasonable degree of proficiency or admit that they can no longer drive safely and surrender their driving privilege. This is a responsibility that must be assumed, and a decision that must be made, for the general welfare of all users of the streets and highways.

Many driver license administrators, from their routine, daily experiences with drivers and summations of their accident and violation experiences, assume that senior drivers present a traffic problem. It is probably a reasonable assumption since drivers can be expected to have some loss of driving skills, develop physical handicaps, fail to keep informed on changes in traffic regulations and, more importantly, fail to keep abreast of required techniques for operating motor vehicles in today's complex traffic patterns.

Periodic Exams

License administrators, backed by recommendations of the American Association of Motor Vehicle Administrators and the Uniform Vehicle Code, have developed licensing programs aimed at periodic recertification of all licensed drivers through re-examinations. In addition, most licensing laws permit re-certification at any time when driving ability is doubtful. Such programs are of particular significance to the senior drivers. If drivers cannot continue to requalify for the driving privilege, it will be denied or withdrawn.

The strengthening of licensing requirements, both for obtaining and retaining the driving privilege, is designed for increased public welfare and is equally applicable to all persons who desire to operate motor vehicles. However, some states—Maine, Delaware, Illinois, Indiana, New Hampshire, and the District of Columbia—require complete re-examinations upon renewal of the driving privilege when stated ages are reached, usually 65 to 70 years.

In addition, 17 states require that all applicants for renewal complete some portion or all of the license examination. It is of interest to note that those states with provisions for complete re-examination may waive the driving test, if the applicant has no disabilities or evidence of senility.

This is not to single out the senior driver for special attention because of age, but because of evidence that his driving skills may have deteriorated since the last examination. This would seem to be a reasonable assumption and requirement based on traffic accident and violation experiences of the older driver. This practice reveals those who cannot or will not keep their driving abilities at a good level of proficiency.

Further, all license administrators do some type of work in the area of driver improvement—that is, attempt to effect improvement among drivers who demonstrate from their driving records that they have not maintained the knowledge and skills evidenced when they qualified for their driver license certificates. These programs attempt to improve all drivers, but they are especially interested in groups of drivers who are having special problems—the older drivers, young drivers and those with disabling physical and mental conditions.

Actions Tell Story

Therefore, senior drivers can be expected to receive attention when they are involved in traffic accidents or violations, or are the subject of complaints regarding their driving ability. Administrators receive many complaints, even from immediate members of the family, regarding the driving of older persons. Quite often they are asked to fail older applicants when they seek renewal of the driving privilege. Therefore, older drivers can expect to receive special attention if they evidence poor driving ability. This does not mean that they will receive attention because they are old, but because their acts or omissions seem to have a direct relationship to age.

Drivers are given special attention when they are involved in traffic acci-

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Elbert Hugunin is a specialist in the National Safety Council's traffic operations division.

dents, commit traffic violations, or are the subject of complaints regarding their driving ability.

Senior drivers have more chance of being called in for attention than drivers of a younger age, unless the latter are quite young. Special attention is given to both ends of the age spread among licensed drivers. The young because they may still exhibit evidence of inexperience, the older because their driving abilities may have deteriorated.

Accident facts developed by traffic accident records systems tend to support the contention that senior drivers can be expected to become a concern in traffic as they grow older. However, assumptions must be introduced when considering traffic accident experience. It is not known to what extent senior drivers continue to drive. However, it is assumed that they curtail their driving and that their exposure rate is quite low.

Where They Err

If this assumption is correct, they are involved in more than their average share of traffic accidents. They tend to get into difficulty during turning movements, at points involving right-of-way, or similar situations in which a high degree of perception, problem solving ability, and immediate reaction are required. Involvement in speeding, operating under the influence of intoxicating liquors and other recognized hazardous actions are relatively low.

It would seem that senior drivers have difficulty in adjusting to the ever changing traffic environment, their skills in perception, problem solving, and reaction are constantly diminishing, and that they are in need of better supervision and control, if they are to be permitted to operate motor vehicles in traffic. At least driver license administrators are making these assumptions and they are developing driver licensing programs based upon these assumptions.

In view of the foregoing, what can the senior citizen expect in the way of driver licensing requirements, if he desires to continue to operate a motor vehicle as age advances?

A pretty good idea of what is in store for him may be obtained by studying the principles and philosophies of driver licensing contained in the American Association of Motor Vehicle Administrators' manuals: *Driver Improvement Through Licensing Procedures,* 1956, and *Driver License Examinations,* 1959.

Considering the developing trends in driver license administration shown in these manuals, the senior citizen may expect the following:

- Required periodic recertification of his overall driving skills when he makes application for the renewal of the driver license certificate—vision, rules of the road, traffic signs and the drive test—the complete examination.

- Complete driving records will be maintained on traffic experience—accidents, violations, complaints, or any other information that may indicate that driving ability is not being maintained.

- Additional re-certification, through appropriate specialists at the expense of the driver, regarding overall physical ability, mental capabilities and any other attributes that might affect safe driving, if they become deficient.

- Closer supervision of driving, or highly restricted provisions for driving, to reduce the risks involved—restrictions as to highways, time of day, days of week, accompanying driver, or other limitations designed to reduce the risks involved.

- Attendance at driver education courses designed to improve concept of traffic problems and thus increase driving skills.

- Appearance before a representative of the driver license division for the purpose of discussing driving problems and administering the necessary therapy for improvement of driving ability.

- Consultations with representatives of the driver license division for the purpose of securing voluntary surrender of the driving privilege.

- Suspension or revocation of the driving privilege when it is evident that administered therapy has not gained improvement necessary for safe operation of a motor vehicle. Obviously, this drastic action will be taken as a last resort.

Faced with these possible routine actions by the driver license administrator, what can the driver reasonably be expected to do to continue to qualify for renewal or retention of the driving privilege? Some reasonable things might include:

1. Admit that the operation of a motor vehicle upon the public highways is not a right, but only a privilege which the state may grant or withhold.

2. Admit that having accepted the driving privilege he cannot object to any conditions which have been attached thereto by a grantor with power to entirely withhold the privilege.

3. Realize that if he expects to gain renewal or retain the driving privilege he must do certain things:

   a. Keep himself thoroughly informed on all changes in the traffic regulations within his city or state, or in any other areas in which he may operate his motor vehicle.

   b. Maintain a high degree of proficiency of operation in constantly changing traffic patterns through study and practice, or restrict his operations to situations he can handle adequately.

   c. On his own, and at his expense, maintain a high level of physical fitness through consultations with specialists regarding areas of possible deficiency and, more importantly, follow the advice of the specialists. Such deficiencies could include heart disorders, visual deficiency, hearing, limited articulation of limbs and other limiting physical factors. Further, he must be willing to adopt the necessary corrections, if such corrections are possible, or willingly relinquish the driving privilege.

   d. Willingly and conscientiously cooperate with the driver license division in therapy designed to effect improvement in his driving ability.

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COMING EVENTS

June 6-10, New York, N. Y.

Traffic Court Conference, Contact James P. Economos, American Bar Association, 1155 E. 60th St., Chicago 37, Ill.

June 16-17, Grand Forks, N. D.

Governor's Safety Conference. Contact Floyd J. Upham, Division of Public Safety, State Highway Dept., Bismarck, N. D.

June 19-22, Ithaca, N. Y.

Seventh National Conference on Campus Safety, National Safety Council. (Cornell University). Contact Francis J. Quinlan, Campus Safety Association, Division of Safety, Cornell University, Ithaca, N. Y.

September 15-16, Rockland, Maine

Thirty-third Annual Maine State Safety Conference. Samoset Hotel. Contact Arthur F. Minchin, secretary, Department of Labor and Industry, State House, Augusta, Maine.

Sept. 22-23, Baltimore, Md.

Governor's Annual Safety Health Conference and Exhibit. Hotel Emerson. Contact Joseph A. Haller, executive chairman, Safety Conference, State of Maryland, 301 W. Preston St., Baltimore 1, Md.

Oct. 10, Washington, D. C.

Ninth Annual Commissioners' and Governors' Conference on Metropolitan Washington Traffic Problems. Statler-Hilton Hotel. Contact Anthony L. Ellison, executive secretary, Metropolitan Area Traffic Council, 301 C St., N.W., Washington 1, D. C.

Study Alcohol Effects In Indianapolis Tests

The Indiana State Police, in cooperation with the Indiana Medical School, will conduct tests of driver impairment from alcohol on June 12, in Indianapolis. It is the purpose of the tests to determine what effects small amounts of alcohol may have on the driving ability of persons taking a series of precision driving tests.

Previous tests for driver impairment have been made with simulated driving techniques or with simple road tests. It is hoped the Indianapolis tests will provide more accurate data on impairment of ability to handle a vehicle under conditions most likely to be found on the road.

A Safety Man's Philosophy

Dan Hollingsworth

MY religion provides for me a hitching post, a firm foundation, a thing to tie to, and the heavier the responsibilities of life become the firmer that foundation is.

In our work in safety, I see the guiding hand and spirit of the Master and see Him as generous and liberal . . . not taking thousands of lives but saving millions.

Our streets, highways and cars and the speed we command in them leave little room for error.

True, the works of the engineering group, the police, the educators and others, even our efforts contribute to our individual and group safety, but considering the rate and type of exposure and the low rate of death and injury, there can be, in my mind, no other explanation than, surely, the grace of God.

My religion is not a theory nor a set of rules but a way of life that is permissive rather than restrictive, positive rather than negative.

True, I'm a bit old fashioned because I believe that His question to Cain and Cain's reply, 'Am I my brother's keeper?', and His answer, 'Thy brother's blood crieth unto you from the ground,' are as true today as they were then.

The golden rule . . . the story of the good Samaritan . . . the fifth commandment . . . the admonition on temperance in all things and self control . . . the commandment to love thy neighbor . . . all these are as workable on Highway 77 between here and Dallas as they were on the road from Jerusalem to Jerico.

I think He means it to be just as wrong to kill a man by our own negligence or carelessness or speed or flare of temper in the use of a car as it was with a stone.

If we are to survive this battle on the streets and highways, my religious belief and my professional training tell me we must learn to respect the dignity of human life and the rights of others.

We must follow that golden rule and learn to love our neighbors, even though they pass us on the right and take the right of way.

It won't do us any good to survive an 'H' bomb war, if we die under the wheels of a car while crossing the street on the way to the neighborhood grocery.

I know my Master was on that road from Jerusalem to Jerico and I know He is on the road from here to Dallas today.

—Dan Hollingsworth, Manager
Oklahoma City Safety Council

The safety movement must meet

The Challenge Of the Age

By Howard Pyle

The National Safety Council's president delivered these remarks before the President's Conference on Occupational Safety in Washington, D. C.

THE accident prevention problems we face in the 60's couldn't be more challenging.

When we think in terms of human life, human misery, the economic consequences of dealing with this issue as it so desperately needs to be dealt with, no real patriot, in the sense of being an active citizen of the United States, can possibly fail to be stimulated and inspired by the great opportunity for public service that is inherent in this challenge.

The National Safety Council, as you probably know, last year put together a document known as *Safety in the 60's*. This volume was produced by way of some 300 direct communications with top leaders in the United States in all fields of activity. Of those we contacted, more than 250 made substantial contributions to the ultimate make-up of this rather extraordinary volume. So, those of us who are here from the Council come to this Conference, where the emphasis is on the future, with a strongly predetermined sense of obligation resulting from the revelations in this document.

On the strength of this background you can understand why we consider it a real privilege to join you in accepting the very biggest challenge we face as we enter the 60's for safety—*the challenge of change itself*. Change, in terms of 99 million vehicles by 1970. Change in the sense that by 1975 our motor vehicles will travel a trillion one hundred seventy one billion miles, as contrasted with 695 billion miles in 1959. Change in the prospect of a population of over 200 million persons in this country by 1970 compared with 177 million today.

This whole idea of tomorrow being revolutionary in the tremendous scope of the changes that are going to happen makes the future almost fantastic to contemplate. Perhaps you would be interested in a finding that came to my attention during my four years in Washington. It has a dramatic relationship to what we are discussing here.

First Billion Is Hardest

It is now reliably known that it took 5,000 years for the first one billion persons to be alive on the face of our world all at one time. This historic milestone was passed in 1850. By 1950, just 100 years later, the second billion persons had joined the first billion in peopling the earth. When is the third billion to arrive? In just twenty years—by 1970. Think of it —5,000 years, 100 years, 20 years! In our cycle of time, three billion persons will be moving around on this globe of ours.

This gives you some idea of the urgency that goes with reckoning with the consequences of the vast changes that are exploding all around us. Generally we can do very little about them except to make them do our bidding a little more than would otherwise be the case.

Not since those unforgettable moments in Paradise when the Creator said, "Thou shalt not eat it," and thereafter when the temptation became too great, has there ever been a time when change has not multiplied the hazards to survival for human beings.

The 60's challenge us to look at the 50's if we have any doubts about the size of the job we have ahead of us, if accident prevention is to stop the useless squandering of so many of our most precious assets.

The sum total of our inadequacies in the 50's is literally appalling. Approximately 935,000 of our men, women and children were killed by accidents during these 10 years. This is just 65,000 persons short of one million who died unnecessarily. Approximately 95 million of our men, women and children were injured by accidents during the 50's. Three million five hundred thousand of these were left permanently impaired.

Accidents in the fifties cost the men, women and children of this country approximately one hundred billion dollars. Can you possibly think of another set of facts more entitled to

be known as *waste at its absolute worst?*

Let me illustrate the significance of just the economics represented here with this true story . . . .

I sat in the Treasury Department a year or so ago talking with the Honorable Robert Anderson, Secretary of the Treasury. He said to me—"Howard, do you know how much a billion dollars is?" I said, "No, I don't believe I do. Could you put it in terms that would help me, as well as others, to comprehend the size of such amounts?" This was his reply. "If, from a reserve of one billion dollars, you had started spending, on the day Christ was born, at the rate of one thousand dollars a day from then until now—365 days of every year, Sundays, holidays, every day for the nearly two thousand years that would be involved—you would still have over two hundred million dollars left.

Reflect on this for a moment while you ponder the fact that accidents over the past ten years have cost this country 100 billion dollars.

It's staggering, isn't it?

Let's look at it from still another point of view—that of the taxpayer.

During my four years as a governor and the four years it was my privilege to serve as a member of President Eisenhower's White House Staff, no voice was raised more vehemently on the subject of waste than that of the taxpayer. Organized groups and individuals without end bombarded us constantly. Their plea, and none could be more deserving of every possible attention, was—*please* do something about the awful burden of the cost of government.

Still, it's from the ranks of these same fine citizens that we draw the accident facts of the 50's—100 billion dollars worth of them—all of it, waste at its worst.

What does it all mean?

It means that this conference has a tremendous responsibility. You have been convened here by the President of the United States, and he has said to you, "During the 1960's, to meet the competition of our age, America needs an ever increasing number of skilled working men and women. These are the nation's pride and

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Thomas N. Boate Honored for Leadership in Traffic Safety

Thomas N. Boate, manager of the accident prevention department of the Association of Casualty and Surety Companies, has been named by the American Museum of Safety as recipient of the Arthur Williams Memorial Medal for "leadership in traffic safety."

Thomas N. Boate

The citation, which points to "more than thirty years of devoted service to the cause of safety" in the United States, was accompanied by a gold watch.

Boate's traffic safety experience covers local and state governmental fields as well as extensive national activities.

He was born at Carlisle, Pa., and started his career in the Pennsylvania Highway Patrol, where he rose to the rank of captain. When the patrol was merged with the state police, he organized and headed the 1,000-man traffic division, becoming the personnel officer and judge advocate. He retired from the Pennsylvania State Police in 1944 and joined the staff of the Association of Casualty and Surety Companies, where he became manager of the accident prevention department, the position he holds today.

The extensive safety programs developed by the association and directed by Boate, including direct assistance in traffic accident prevention for state and local officials which touches all phases of traffic accident prevention have won national recognition.

During the years, Boate has been active on many national committees and in national safety organizations. He has served as member and chairman of the Traffic and Transportation Conference of the National Safety Council and as a member of the board of directors of the Council; he is chairman of the executive committee of the Greater New York Safety Council; a member of the National Committee on Uniform Traffic Laws and Ordinances; a member of The President's Highway Safety Committee, and a member of the New York State Citizens Council on Highway Safety which he organized and served as first chairman.

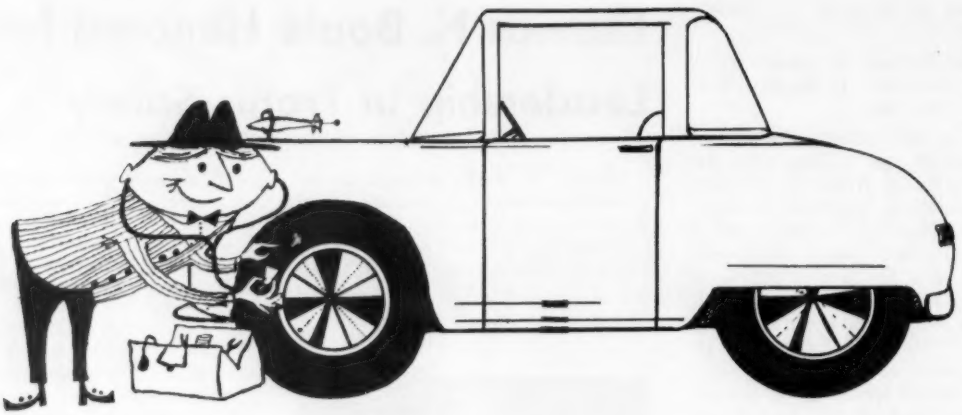
In recognition of his work for the international "Slow Down and Live" traffic safety program, Boate was named an honorary member of the Association of State and Provincial Safety Coordinators. He has also been prominent in municipal affairs, serving as a member of the police commission at Port Washington, Long Island, where he resided for several years.

Fletcher N. Platt To NSC Board

Fletcher N. Platt, manager of the traffic safety and highway improvement department, Ford Motor Co., has been appointed to the board of directors of the National Safety Council.

Mr. Platt, who also is a director of the Traffic Association of Detroit, previously has served on committees of the National Safety Council. He is active in several other organizations, including the National Highway Users Conference and the Michigan Citizens Safety Action Committee.

He has directed Ford's traffic safety and highway improvement activities since the department was formed in 1954.



Keep Your Eye On Your Tires

Almost any late model car today can achieve what was considered "racing car" speeds a few years ago. Modern turnpikes and freeways permit you to drive at higher speeds for long distances. Sustained high-speed driving can drastically reduce tire mileage and, unless care is exercised, result in sudden, dangerous tire failure.

You can obtain all of the trouble-free mileage built into your tires only if you give them the proper care. The following "tips" on proper tire care, if you use them, will result in better tire performance, will save you money, and could save a life—perhaps your own!

Proper Tire Care . . .

makes driving safer, car operation more efficient.
Follow these five simple rules to prevent costly inflation failures

1. Make sure that tires are kept inflated to the recommended pressure. Check regularly. (Inflate tires only when they are cool.)

2. See that the valve caps are kept screwed on finger-tight.

3. Never try to make an *old* valve core do the job. Replace with a new one.

4. Check for slow leaks whenever air pressure shows a decided drop. Have slow leaks investigated and repaired at once.

5. It is normal for tires to "build up" a few pounds of air pressure after being run. Do not reduce ("bleed") this pressure. Bleeding of tires causes excessive flexing of the sidewalls and results in abnormally high internal tire temperatures. Furthermore, when tires cool off, they will be badly underinflated.

IMPORTANT! When you anticipate driving at sustained top legal speeds, increase the air pressure in your tires four (4) pounds above normally recommended cold starting pressure. This precautionary measure can help reduce (but not eliminate) high speed tire distortion and its dangers.

High speed causes dangerous distortion in tires. It becomes more severe in overloaded or underinflated tires. The tread becomes stretched and distorted. Excessive heat builds up in the tire. This, if prolonged, may cause the tire to come apart. Continuous, excessively high speeds cut tire life in half.

Out-of-Balance Wheel Assemblies . . .

ruin tires, give cars the "shakes." Shaky, shimmying wheels are caused by all or part of the rotating assembly being out of balance. An assembly out of balance will develop a sledge-hammer pounding at 60 m.p.h.

There are two main symptoms of out-of-balance:

1. "Tramp" or road shock usually occurs at higher speeds and is felt through the steering wheel as vibration that increases with speed.

2. "Shimmy" is a rapid side movement of front wheels which usually is apparent in sidewise vibration of the front end.

Either of these symptoms calls for a trip to a dealer with balancing equipment.

Mechanical Irregularities . . .

contribute to uneven, rapid tire wear. A few of these are listed below and can be corrected by a qualified mechanic:
Excessive camber (wheels tilted inward or outward) causes rapid wear on *one* side of tires.

Excessive toe-in or toe-out of wheels results in tires with a "feathered edge" and excessive wear.

Faulty or "grabbing" brakes can cause much the same symptoms as "out-of-balance" wheels, flat spots and bald spots.

Faulty or worn shock absorbers cause irregular tire wear and lead to other mechanical irregularities.

Careful Driving Habits . . .

mean longer tire service. The service that tires deliver is largely in the hands of the driver. Careless driving habits can result in serious tire damage. Good drivers follow these tire-saving practices.

1. Use correct air pressure.
2. Do not overload.
3. Do not drive over curbs, chuckholes or other obstructions.
4. Avoid riding edge of pavement.
5. Avoid speeding over rough roads, and around curves.
6. Drive at moderate speeds.
7. Avoid fast stops and starts.
8. Inspect tires regularly.
9. Rotate tires on car at regular intervals.

Proper Inflation . . .

pays off in longer life. Every tire represents a fine balance of forces created by the air pressure within the tire and the resistance of the cord body and other component parts of the tire to this air pressure. Correct pressure must be maintained to keep these forces in balance.

Too little air pressure produces abnormal deflection of the tire and causes the tread in the shoulder area to wipe and scuff on the road. Extra strain is placed on the cord body of the tire and this increases the chances for fabric injuries and separation.

Too much air pressure is equally bad. Overinflation reduces the deflection from normal and causes the tire to wear in the center of the tread.

Changing a Flat Tire

- Pull well off the road.
- Put out emergency markers—reflectors, flares, flags, etc.
- Remove jack and spare tire at same time.
- Remove hub cap and loosen wheel lugs.
- Block wheels and jack up car.
- Remove wheel lugs and flat tire wheel, replace with spare.
- Replace wheel lugs and jack car down.
- Re-tighten wheel lugs with weight of car on them. Replace hub cap.
- Stow wheel blocks, flat tire, jack and handle in trunk.

Things to Remember

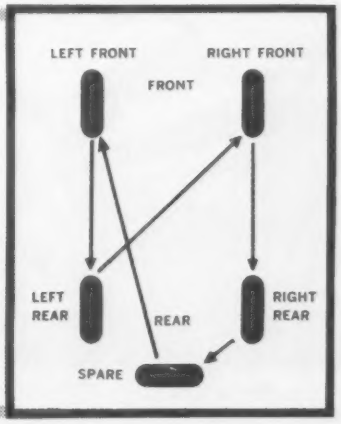
- Have your brakes adjusted regularly.
- Have your shock absorbers checked.
- Use the proper size tires for your car.
- Do not overload your vehicle.
- Do not start and stop quickly.
- Keep oil and grease off tires.
- Give your tires a rest once in a while when traveling on a long trip.
- Avoid hitting holes or sharp objects.

IN CASE OF A BLOW-OUT: Get a firm grip on the wheel. Accelerate slightly, if necessary, to keep car under control. Come to a stop slowly.

Tire Rotation . . .

increases tire mileage. Tires must be rotated and run in different wheel positions to equalize wear. When tires wear unevenly (especially front tires) and are not rotated, the uneven wear becomes more pronounced. This will cause disturbances such as shimmy, vibration, noise, bumpy or rough riding. Rotate tires every 5,000 miles.

Have your tires examined periodically. Frequent inspections prevent flat tires. They may disclose nails, bruise damage or cuts in your tires which, if not repaired, could result in costly damage.



Poor driving habits can cost you money by cutting tire life in half.

It is not good to lower tire pressure when driving on snow or ice. Traction is reduced.

Tire failure is a major cause of expressway accidents.

If you drive five minutes at 100 m.p.h., you can fry an egg on your tire.

AAA's contract garages reported well over 12 million tire service calls in one year.

A two-ton car has only 125 square inches of tire surface in contact with the road.

Reprints of this Fact Sheet are available. See page 28

THE LEGISLATIVE HOPPER

A roundup of significant traffic safety legislation

Driver Education And Improvement Schools

New Bills Introduced

Rhode Island—H. 1493—provides for system of driver training in schools for persons age 15 through 17 and prohibits issuance of license to person under age 18 who has not passed such course. *S. 476*—provides for driver training classes in schools; bans licenses for those under 18 who have not passed such courses after a certain date.

Action and Additional Information

Arizona—S. 65—increases vehicle registration fee from $4.00 to $4.50 and allocates proceeds of increase to driver training program—passed Senate.

South Carolina — H. 2183 — authorizes issuance of special restricted driver license to person holding instruction permit and issuance of instruction permits to students enrolled in driver training courses—passed House.

Juvenile Drivers

New Bills Introduced

Mississippi—S. 1843—prohibits issuance of driver license to persons under age 16.

New Jersey—HCR 38—requests motor vehicle director to revoke driver license of person under 21 who is convicted of motor vehicle law violation involving drunk driving.

Action and Additional Information

Kentucky—H. 506—provides for the issuance of provisional operator's license to persons between 16 and 18—passed House.

Virginia—H. 230—amends procedures and conditions for issuance of driver licenses to persons under 18—killed, House.

Executive Action

New York—S. 569—prohibits use of junior driver license in Nassau County—approved. *S. 570*—permits person with junior driver license to operate vehicle at night only if accompanied by parent—approved.

Virginia—H. 103—permits certain counties to prohibit persons under 18 from driving within county limits—approved.

Chem Tests—Drugs

State Developments

New York—Gov. Nelson Rockefeller has approved a bill making it a traffic infraction to drive an automobile while under the influence of alcohol. The purpose is to remove from the highways those drivers who are not legally intoxicated under the present law but who have been drinking sufficiently to constitute a threat to safety. Conviction will result in mandatory suspension of driving privileges for sixty days, and—for a second conviction in a three year period—suspension for 120 days.

New Bills Introduced

Kentucky—S. 177—prohibits operation of motor vehicle by person addicted to use of narcotics or amphetamines or under influence of other drugs.

Mississippi—S. 1680—provides for chemical tests in drunk driving cases.

Action and Additional Information

Maryland—S. 52—requires physicians to report narcotic addicts to motor vehicle department—passed Senate.

Massachusetts—H. 2401—requires advising person accused of drunk driving of right to be examined by physician—passed Senate.

Michigan—H. 334—establishes evidentiary presumptions for chemical analysis of drunk drivers—passed House.

Mississippi—H. 272—provides for one year revocation of driver license upon forfeiture of bail on charge of driving under influence of liquor or narcotic drugs — passed House.

New York—H. 376—makes it traffic infraction to operate vehicle when ability is impaired by consumption of alcohol—killed, House. *S. 638*—makes person guilty of traffic infraction who operates vehicle while ability to so operate is impaired by alcohol — passed House. *H. 1035* — fixes punishment for conviction of driving vehicle while in intoxicated condition—passed Senate.

Virginia—H. 357 — prescribes evidence admissible upon trial of a charge of driving while under the influence of intoxicants; provides that operation of motor vehicle on a public highway gives consent to a blood test—amended, passed House. *HJR 100*—directs Advisory Legislative Council to continue its study of drunk driving and statutes relative thereto—passed Senate and House. *H. 569*—relates to chemical tests in drunk driving cases—passed Senate and House.

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WHY ARE SEAT BELTS LIKE PARACHUTES?

Charlie Flack, a Farmers Mutual Claims adjuster, was driving this company car when it skidded on a patch of ice, went down a six foot embankment, rolled over, and ended up looking like this.

Charlie loosened his seat belt, crawled out of the car and began to pick up claims files. He suffered a broken vertebra, for which he was hospitalized, but he's OK now.

In reporting the accident, *FM*—Farmers Mutual publication—made this comparison: a seat belt is somewhat comparable to a parachute—or life insurance—*if you need it and don't have it, you are likely never to need it again.*

Spokane Uses "Snorkel" Device To Collect Parking Fines

by Clifford N. Payne

FOR the past few years the congestion in the police desk at the traffic violations counter in the Spokane Police Department has been rapidly increasing. It was not possible to correct this problem by securing additional space since the entire department is crowded into a very small area.

Upon surveying the situation we found that the largest single group requiring service was those people posting bonds for parking violations. It was finally decided that if a curb device could be put into service it would help relieve the congestion.

We first considered putting a small office under the sidewalk and installing a device such as that used by some local banks. But, if we had used this method, two additional clerks would have been needed to handle the business.

Finally, we hit upon the idea of installing a pneumatic tube device which would carry the parking citations and payments from the curb into the present traffic desk.

Clifford N. Payne is chief of the Spokane Police Department.

Two pneumatic tubes were purchased at a cost of $5.00 from a local business establishment that had abandoned the pneumatic system of cashiering. A used vacuum cleaner was purchased for $20.00, from which the motor and blower were salvaged and used to provide a vacuum in the tubes. An old traffic control box was installed on a metal base and bolted to the concrete curb, just high enough for people to reach without moving from the driver's seat. The upper part of the box has printed instructions on how to operate the device.

There is a button which the customer pushes to notify the clerk inside the station. There is also a two-way intercom system so that people can ask questions and receive answers from the traffic desk. The person paying the bond can either find the schedule on the reverse side of the citation or make inquiry of the clerk.

A small wire basket is placed inside the panel box which contains a tube-shaped cartridge in which the citation and money are placed. The customer then drops the cartridge into the tube where it is forced through the tube and into the basket in the traffic office. A clerk takes the citation and money and rings up the transaction on the cash register; the register furnishes a court receipt showing paid, transaction number, date, ticket number, the amount of the bond, and the initials of the clerk. This receipt and proper change if any are placed inside the cartridge; it is dropped into the tube and returned to the device at the curb. The customer takes his receipt and change and is free to leave.

The entire transaction takes about one minute. Repeaters familiar with the operation finish the entire transaction within 20 seconds.

The curb device has been named the "Snorkel" by the men of the department and the public. It is open for business from 8 a.m. until 6 p.m. and averages over 160 transactions per day, or between 75 and 80 per cent of the total violations handled through the police court. A total of 64,172 parking citations were handled through the police court from October 1, 1958 to October 1, 1959, for a total of $92,000. The traffic desk was open a total of 306 days during the same period. During this time at least 49,000 persons made use of this device. There is no question that this snorkel has reduced the foot traffic into the police desk by almost 50 per cent.

After using the device for over a year we have found that it accom-

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Driver puts money and citation into cartridge, drops cartridge into tube and presses button.

Cartridge pops into basket in traffic office, clerk rings up transaction on cash register.

Awards Made for

BEST SAFETY FILMS OF 1959

Seven non-theatrical motion pictures were cited with bronze plaque awards by the National Committee on Films for Safety as the best safety films of 1959.

Eleven non-theatrical films, two soundslide films and a series of television spots were given awards of merit.

The safety films committee, which represents 23 national associations, annually recognizes outstanding new films on occupational, traffic and transportation, general and home safety. The committee seeks to improve the public's knowledge of safety through visual means.

John B. McCullough, director of technical services, Motion Picture Association of America, is chairman of the committee. William Englander, director of films and posters, National Safety Council, is secretary.

The 1959 award winners are:

Occupational

Motion Picture (Plaque)

Cause Undetermined, produced by Bay State Film Productions for several sponsors.

It's Up To You! produced by Harvest Films for Wise Owl Club of National Society for Prevention of Blindness.

Motion Picture (Certificate)

Communication for Safety, produced by Cal Dunn Studios for National Safety Council.

A Tale of Two Towns, produced by Audio Productions for self.

What Caused the Crash? produced by Army Pictorial Center for Department of the Army.

Traffic and Transportation

Motion Picture (Plaque)

The ABC of Walking Wisely, produced by Sid Davis Productions.

Freeway Driving Is Different, produced by the American Automobile Assn. for self.

Nightmare for the Bold, produced by Atlas Film Corp. for U. S. Air Force.

Motion Picture (Certificate)

Driving the Super Highways, produced by Ford Motor Co. for self.

Last Clear Chance, produced by Wondsel Carlisle & Dunphy for Union Pacific Railroad Co.

Signal 30, produced by Safety Enterprises for self.

Signs Take a Holiday, produced by Cal Dunn Studios for National Safety Council.

You and Your Driving, produced by Fordel Films for Esso Safety Foundation.

General

Motion Picture (Plaque)

Outboard Outings, produced by Aetna Casualty & Surety Co. for self.

That They May Live, produced by Pyramid Film Producers for self.

Motion Picture (Certificate)

Everywhere . . . All the Time! produced by Pilot Productions for Allis-Chalmers Manufacturing Co.

Rocket Club, produced by Douglas Productions for Daisy Manufacturing Co.

Home

Motion Picture (Certificate)

The Challenge, produced by Audio Productions for National Board of Fire Underwriters.

Soundslide Film (Certificate)

The Fable of Freddy Fire, produced by Filmfax Productions for Hartford Fire Insurance Co.

Poisons in Your House, produced by Sidney Plancner for Academy of Medicine of Cleveland and Cuyahoga County Coroner's Office.

TV Spots and Shorts

(Certificate)

Bumper Hugger, Don't Drive When You're Upset, Show-Off, Highway Hypnosis and *Jaywalkers*—series produced by UPA Pictures for American Automobile Assn.

Holmes Heads Church Division

Harold J. Holmes has been appointed director of the church safety activities division of the National Safety Council. He succeeds John T. Kenna, who resigned last March.

Harold J. Holmes

Holmes has been the Council's district director in Illinois and Indiana since 1958. He was formerly with the Inter-Industry Highway Safety Committee (now the Auto Industries Highway Safety Committee) and has also been an assistant professor of safety and aviation education at South Dakota State College of Agriculture and Mechanical Arts and has taught English and driver education at Wayzata (Minn.) High School.

A native of Minnesota, Holmes received his bachelor's and master's degrees from the University of Minnesota. He served as a Navy pilot for three years during World War II, and is now a lieutenant in the Naval Reserve. He is an elder in the United Church of Christ of Bartlett, Ill., and is secretary of the church council.

National Safety Council Policy on

Miniature Motor Vehicles

THE NATIONAL Safety Council opposes the use of miniature motor vehicles, commonly called carts, or go-carts, by drivers below driver licensing age.

While the laws of all states exclude these miniature vehicles, designed primarily for use by children, from the public streets and highways, there is little or no control over their use on private property. As a result, children have been killed or injured operating these vehicles, sometimes in speed events sponsored by adults. Motor vehicle speed events of any type are opposed by the National Safety Council.

The Council therefore urges parents, dealers in these vehicles, and organizations to refrain from sponsoring or conducting competitive events using miniature motorized vehicles, and to do all possible to see to it that they are at no time operated by persons under legal driver age.

Approved by the Traffic Conference in March, 1960.

INSTALL EFFECTIVE MEDIAN BARRIER ON CALIFORNIA FREEWAYS

ALTHOUGH Southern California's freeway system has reduced the total number of head-on collisions that occur on standard two-way streets, 20 per cent of the fatal accidents that occur on freeways are cross-median.

To prevent this type of high-speed accident, the California Department of Highways has conducted exhaustive studies of various types of freeway median barriers. Besides attempting to provide complete prevention, the department has also attempted to prevent deflection (bouncing back into oncoming traffic) and minimize injury to both the vehicle and its occupants.

The latest, and seemingly the most effective, answer to date is the combination steel cable and chain link fence barrier.

Initial installation was on the Ventura Freeway for some three and one-half miles. Construction was completed about the first of this year, and since that time there has been an average of one cross-median barrier accident a week in that area.

The unique design of this type of barrier is credited with saving the life of every person involved in cross-median accidents. Basically, the fence is composed of a four-foot, two-inch chain link fabric supported by 2¼-inch H-section steel fence posts. The workhorse of the fence is three lengths of ¾-inch wire rope.

One length of wire rope is placed at the bottom of the fence, nine inches above grade. The other two ropes are located two feet, six inches from grade, parallel to each other on each side of the wire fabric. Two and one-half-inch "U"-bolts clamp the cable to the posts which are placed eight feet on center.

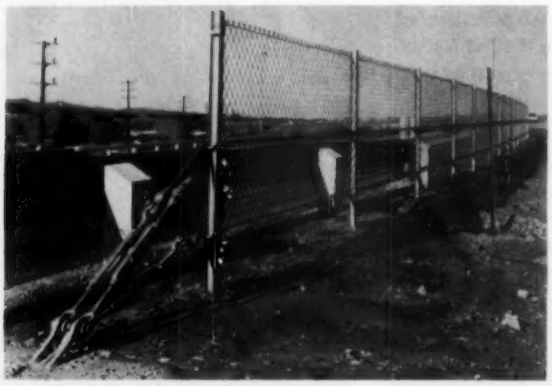
Three, one-inch-diameter closed eye bolts extend into the twenty-one-inch-deep concrete anchor block placed at each end of the barrier. Jaw and jaw turnbuckles connect the individual cables to each of the three-foot-long eye bolts.

In tests conducted by the Highway Department utilizing automobiles driven into the barrier at a 30 degree angle at 60 m.p.h., this type of fence tended to slow the vehicle and halt it without allowing it to cross into opposing lanes or bounce back onto the freeway. Actual median barrier accidents have proved the results of these tests.

As each cable is specified for a minimum breaking strength of 21.4 tons, the hurtling vehicle is actually caught by the three steel strands and deflected to slide along the wire rope. As the vehicle moves forward, the H-posts are either sheared off or bent under, providing a slowing action. At this same time, the chain link fence tends to ball up in front, forming a resilient barrier as it packs into the front end of the vehicle.

Maximum cable deflection is designed for eight feet on each side; however, the safest median width has been determined to be 16 feet, so that there is no danger of collision with portions of the halted vehicle. This would permit close following vehicles to avoid striking the wrecked vehicle.

This type of median fencing has been, or is currently being installed on the Hollywood-Santa Ana and San Diego-Ventura Freeways and is budgeted for the Harbor-Pasadena Freeway.



Fence's heavy turnbuckles secure the wire rope, preventing vehicles from crossing median strip.

The auto was salvaged and the driver (dummy) was not seriously injured in this 60 m.p.h. crash.

NEWS FROM CAPITOL HILL

THE President recommended creation of a federal agency, and appropriation of over one-quarter of a billion dollars in federal funds over eight years, for a mass transportation system in the Washington metropolitan area. The plan envisages a coordinated system of rail transit, express buses, and highways. The area covered includes the District of Columbia, two Maryland counties, four Virginia counties, and two Virginia cities. The plan's relation to the national capitol was given as justification of the federal interest.

The new federal agency would have authority to:

(1) Make grants to regional highway directors to build essential links in the road system, acquire median strips in freeways for mass transit use, construct express bus stops and outlying parking lots for transit users on freeways.

(2) Improve and expand bus service.

(3) Construct a rapid transit subway system.

Balanced System

At about the same time the President forwarded to Congress, without comment, a 78-point report of the U. S. Department of Commerce, a result of a study undertaken at his request. This report, "Federal Transportation Policy and Program," designed to make the nation's transportation system balanced and efficient, deals with all aspects of transportation.

This report says metropolitan area congestion "is primarily a local problem" but recognizes that "the federal government contributes toward the problem with its huge highway program." The report recommends "federal participation" toward the efficiency of urban transportation, and proposes that the federal government "help finance the over-all transportation plan."

In particular, Recommendation No. 49 suggests that the federal government "encourage urban long-range community planning, including total transportation planning to make full use of highway, transit, rail commutation, and all other capacity to minimize total transportation cost and congestion." Recommendation No. 50 proposes joint federal-local investigation of basic approaches to such plans and their financing, including "charges on city highway gateways to divert auto commuter travel to mass transport means."

Other pertinent recommendations include: No. 61: encourage a uniform system of state regulation of sizes, weights, safety appliances, and related matters of highway vehicles in interstate commerce; No. 73: codification of federal safety regulations and related materials in a single publication; No. 74: coordination of policy among federal agencies with "particular attention to ways of relieving transportation of over-detailed safety regulation."

Another development in connection with metropolitan mass transportation is S. 3278 introduced by Sen. Williams (N. J.) and 11 other senators. The bill would use current federal urban planning grants under the Housing Act to:

(1) Help determine the total transportation needs of metropolitan areas.

(2) Help formulate programs for use of existing mass transportation facilities.

(3) Help coordinate the planning activities of public transportation agencies.

The proposed legislation would also allow long-term, low-interest loans to states and local governments up to $100 million, in order to:

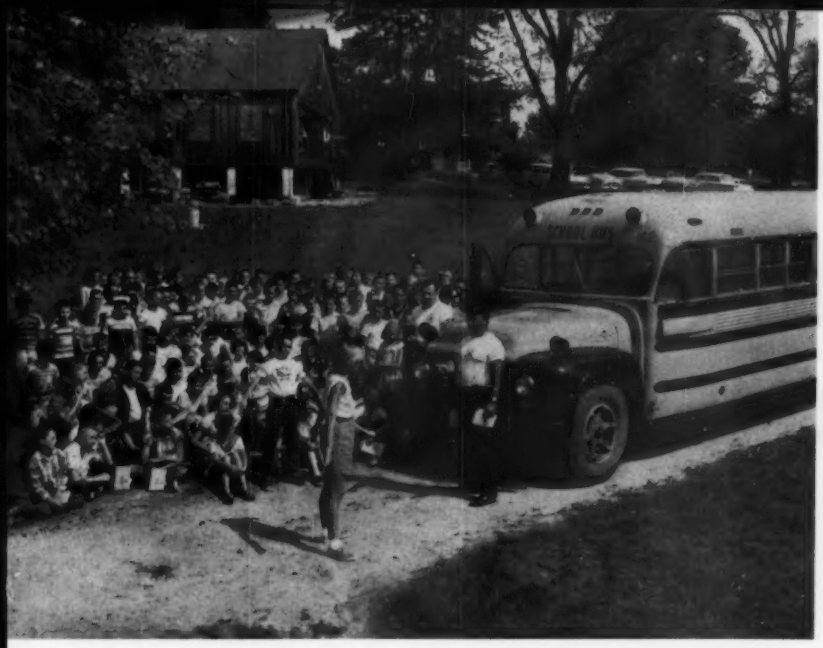
(1) Help coordinate and integrate construction of highway, bus, surface-rail, underground, and other mass transportation facilities.

(2) Help finance acquisition, construction or improvement of equipment and facilities for use in mass transportation or commuter service.

Proposed Register

The Roberts Subcommittee on Health and Safety, in the House, held hearings on H.R. 5436, introduced by Rhodes (Ariz.), to set up within the U. S. Department of Commerce a register of names of persons whose motor vehicle operator's license was either refused or revoked. Although such a register was recommended in the Secretary of Commerce's report to the Congress on "The Federal Role in Highway Safety," the Department of Commerce urged deferment of enactment to enable completion of a study of costs and various administrative aspects of the proposal. The bill's sponsor highlighted the inaction by the states in acting jointly. "If the states are not going to do it, the federal government must take the lead."

George C. Stewart, executive vice-president, National Safety Council, testified that: "The Council recognizes the need for, and earnestly desires, the establishment of a service that will make information as to revocation or denial of a driver's license in one state readily available to other states." He stated that the "Council would wish that this could be accomplished without the creation of a new federal agency, but recognizes that progress to date on a cooperative basis among the states has been disappointing." However, he warned that a substantial proportion of the Executive Committee of the Council's Traffic Conference, "expressed varying degrees of reservation as to the feasibility of effectively administering the proposed services" of H.R. 5436. The AAMVA testified in opposition to the bill in terms of "the practical problems" involved.



AAA Summer Campers Learn Patrol Duties

THERE'S a summer camp for boys and girls that operates differently from most others. It places emphasis on teaching children something they can practice all year round—School Safety Patrol Operation.

Children who attend are fifth and sixth graders from Washington, D. C. and the nearby counties of Maryland and Virginia. They are chosen for their qualifications as officers in their school safety patrols for the coming school year.

Sessions are conducted by the D. C. Division of the American Automobile Association, at two locations: one operated by the Alexandria Police Association in Virginia, the other provided by the Children's Fresh Air Society of Baltimore.

At these sites, children may stay overnight for a six-day term, or participate in a newer day camp arrangement that lasts four days.

On arrival, each child is presented with a manual on Safety Patrol Operation, and a schedule of classes that meet twice daily for 55 minutes. The child receives approximately eight hours of instruction, including training films on patrol operations, lectures on the care of patrol equipment and how to conduct a patrol meeting. A period is devoted to school bus operation. "On-the-job" handling of typical situations is given at a simulated intersection.

The classes are taught by safety coordinators, policemen assigned to the sessions by their respective police departments. Instructors are rotated to give individual advice on local problems. They also serve as counselors to the campers attending. The staff is

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College students aid instructors (left) by supervising recreational activities and by acting as counselors to boys and girls who attend the summer sessions.

Instructors use a simulated intersection (below) in class designed to teach future officers proper performance of patrol member's duties as a crossing guard.

SEAT BELTS ON CAMERA

TV producer's safety series makes Roanoke crash conscious

by Richard Williford

Judge Beverly T. Fitzpatrick (left) and Don Costa help Ann Howard launch her safety series by showing her how easy it is to use an automobile seat belt.

THEY'VE made a lot of progress in strapping down the auto accident injury problem in Roanoke, Va., because a certain lady became a firm believer in the value of auto safety belts. Ann Howard, a busy, vivacious free-lance television producer, took a look at the Roanoke Valley traffic accident statistics and decided to tighten the cinch on one of her community's most urgent problems.

Ann was appalled by the number of traffic deaths and injuries in Roanoke County which she felt might have been prevented by the use of seat belts. She thought it was high time her fellow citizens got the true story of the benefits of seat belts, so she went into action.

She thought of the newly formed Roanoke Valley Safety Council, and went to them offering the services of her television show "Panorama." Before she left the council offices, a seat belt committee was created, with Miss Howard at its head, to further study the problem.

Using her WDBJ-TV show, Ann got her campaign rolling. Each weekday, she stars on her own 30 minute program which carries her exhilarating personality to some 225,000 viewers. The show is of the "women's service" type and has been rated one of the state's best "live" programs. The free hand Ann uses in selecting material for her show came into play when she conceived the idea of devoting a 10 minute segment of Panorama to safety, and kicking off the weekly feature with her new seat belt campaign.

Her technique of projecting the desirable qualities of seat belts was to use interviews with important people in the field of safety, along with local personalities. Guests, usually experts in the field of driving, would be interviewed to promote the use of seat belts.

On one of the initial shows, Miss Howard interviewed Judge Beverly T. Fitzpatrick, president of the Roanoke Safety Council. Her own views were strengthened when the judge said, "Indisputable statistics indicate both death and injury are reduced as much as 60 per cent, on the average, by the use of seat belts during times of impact. It has been established beyond reasonable doubt that seat belts are the greatest single casualty reducer—once the crash has occurred—known in the country today, and applicable to the vehicle now on the road."

To give her appeal both variety and scope, Miss Howard brought to her audience many people from varying occupations and walks of life. The regional representative of the National Safety Council, a commercial airlines manager, an insurance claims adjuster, state troopers, a minister, a prominent clubwoman, and an official of the Governor's Highway Safety Committee were among those interviewed during the series.

Ann and Dr. Louis Ripley, an orthopaedic surgeon, discussed injuries to the head and upper body that may be prevented through the use of belts.

Dr. Ripley pointed out that, "Statistics show that, at the present rate, one out of every family of four will be killed or seriously injured in an automobile accident."

Not Just a Crash Strap

By probing into the effectiveness of seat belts, some other points regarding their use were brought out. Ann's interviews revealed that belts are useful as fatigue fighters because they serve to reduce both mental and physical driving tension by keeping passengers in an upright, relaxed position.

Many of the interviewees agreed that seat belts also serve as a constant safety reminder merely by their presence and constant use. They tend to remind drivers and passengers alike of today's driving dangers—the reason they were purchased and installed They say "Don't speed; be alert."

It was brought out, too, that seat belts restrain the actions of children and make passengers who are drivers themselves feel more secure while riding with another driver.

Miss Howard interviewed a psychiatrist who called attention to the growing need for testing attitudes as well as physical and mental fitness when examining drivers-to-be.

When Ann Howard found that most women thought that using seat belts would muss their clothes, she fell back on her telecasting know-how to combat this impression. The notion was nicely dispelled when Ann brought a fashion show to Panorama. Cars equipped with seat belts were used as props for the models. Ann got her point across.

While originally planned for a limited run, the project has been given a weekly 10 minute feature spot since July, 1958. It was decided not long ago to make it a permanent segment of the show devoted to traffic safety.

Someone was impressed with Ann's safety work and nominated her for the Carol Lane Awards for Traffic Safety—which are conferred by the National Safety Council through a grant of Shell Oil Co. Her entry was a winner, netting her a $500 U. S. Savings bond and a bronze plaque.

But Ann had barely started rolling on her traffic safety crusade. The seat belt committee she formed, and headed with Dr. Ripley, was only the beginning of her "off-camera" efforts to follow through in her campaign.

She began to work with the safety council to plan a community-wide, continuing promotional effort to educate the public on the importance of seat belts. Ann distributed copies of the Ford Motor Co.'s pamphlet on seat belts and, when it was discontinued, rewrote it and persuaded a local soft drink bottler to pick up the tab for printing 5,000 copies which she promptly gave out.

Miss Howard went on to conduct a direct mail campaign urging the members of 100 women's organizations in the Valley to give seat belts as Christmas gifts. She received help in this

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Ann's TV fashion show used autos to help overcome an idea held by many that seat belts muss one's clothes.

Supt. C. W. Woodson, Jr., Virginia State Police, added to the success of Ann's traffic safety campaign stressing the need for individual driving responsibility.

BOOSTERS

USE THESE AIDS . . .

Anytime is a bad time to have an accident, but on a vacation even a minor accident can cause many times more trouble and frustration. And a serious accident, at best, is enough to spoil the family fun. Traffic Safety fact sheets offer the kind of hard-headed advice that can prevent vacation mishaps. Look down the list below for titles that apply to vacation driving.

Boat Trailers (329.96-2)
Driver Improvement Schools (329.96-3)
Traffic Law Uniformity (329.96-4)
Use of Turn Signals (329.96-5)
Your Responsibility in an Auto Accident (329.96-7)
The Man with a License to Kill (329.96-8)
Drinking and Driving (329.96-9)
Vote for Driver Education (Driver Education in High School) (329.96-10)
Stopping Distances (329.96-11)
How to Park Your Car (329.96-12)
Driving on Superhighways (329.96-13)
Children in the Car (329.96-14)
Traffic Courts on Trial (329.96-15)
Tips on Mountain Driving (329.96-16)
Is Your Car Sick, Sick, Sick? (Vehicle Maintenance) (329.96-17)
Smart Drivers Use Seat Belts (329.96-18)
Driving Tips From the Pros (329.96-19)
The Yield Sign and Flashing Lights (329.96-20)
Uncontrolled Intersections (329.96-21)
Chemical Tests Protect You (329.96-22)
It's Called City Driving (329.96-23)
The Case For Traffic Enforcement (329.96-24)
Traffic Accident Facts (329.96-25)
Buying A Car? (329.96-26)
Night Driving (329.96-27)
Accident Records (329.96-28)
When Your Car Stalls (329.96-29)
Rural Driving (329.96-30)
Good Vision Protects You (329.96-31)
Good Visibility Is A Must (329.96-32)

Order by title and stock no., e.g. **Boat Trailers** (329.96-2). TRAFFIC SAFETY reprint prices: minimum order 50, each: 50, $.05; 500, $.035; 1,000, $.028; 5,000, $.025; 10,000, $.02.

HOW TO HAVE A PLEASANT VACATION

Vacation Bound—Just published, this is the Council's new vacation leaflet. Brightly illustrated in four colors, the leaflet contains eight pages of cartoon illustrations and text covering the hazards that have to be avoided to keep any vacation safe and pleasant. Stock No. 194.39. Each: 50, $.07; 500, $.065; 1000, $.055; 5000, $.045; 10,000, $.042; 20,000, $.04.

THREE VACATION BOOKLETS

These attractive and readable booklets were written for vacation bound families. Like the Council's new vacation booklet, above, these contain tips on boating, swimming and vacation driving. Eight pages in full color.

Let's Go On A Safe Vacation—Stock No. 194.36. Each: 50, $.06; 500, $.055; 1000, $.045; 5000, $.04; 10,000, $.035; 20,000, $.032.

Have Fun—Stock No. 194.37. Each: 50, $.06; 500, $.055; 1000, $.045; 5000, $.04; 10,000, $.035; 20,000, $.032.

Time For Fun—Stock No. 194.38. Each: 50, $.06; 500, $.055; 1000, $.045; 5000, $.040; 10,000, $.035; 20,000, $.032.

FILMS

Vacation Safety—A motion picture pointing out how the vacationing family must guard against accidents. Swimming, boating, athletics and camping are covered. Running time 10 minutes, 16mm black and white sound. Stock No. 171.89. Each: 1, $72.00; 2, $68.00; 10, $66.00.

The film may be rented from Association Films, Inc. at $11.00 per week. Orders and correspondence regarding film bookings should be addressed to the nearest local office of Association Films:

EASTERN AREA: Broad and Elm, Ridgefield, N. J.

MIDWEST: 561 Hillgrove Ave., La Grange, Ill.

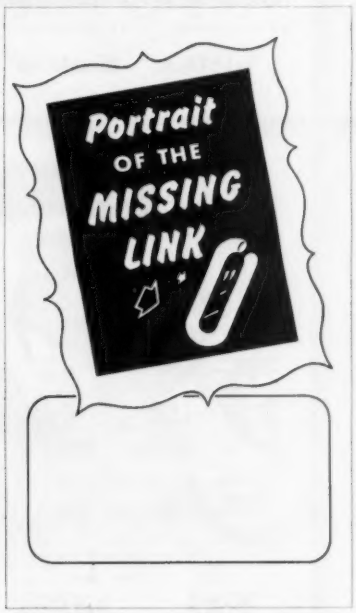
WEST: 799 Stevenson St., San Francisco 3, Calif.

SOUTHWESTERN: 1108 Jackson St., Dallas 2, Tex.

Invoices for the rental fee will be issued by Association Films. If you wish a rental charge to be deducted from your Service Credit, please mark your order, "Bill National Safety Council."

MATERIALS

ORDERS FOR NEW POSTERS SHOWN CANNOT BE SHIPPED UNTIL AFTER AUGUST 1



TRAFFIC SAFETY LEAFLETS

Four-page illustrated leaflets which provide safety tips and information for motorists.

Be An Alert Driver—Vacation driving. Stock No. 391.31.

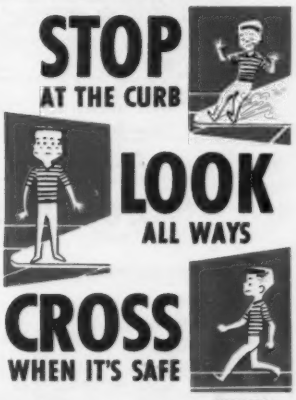
Vacationland—Home, Have a Safe Trip—Stock No. 391.24.

Portrait of a Missing Link — Vehicle maintenance. Stock No. 391.50. In pkgs. of 100 only. Each: 1, $2.90; 10, $2.50; 50, $2.30; 100, $2.20; 200, $2.10.

NEW TRAFFIC POSTERS FOR SEPTEMBER POSTING

©NATIONAL SAFETY COUNCIL

T-1951-C 25"x38"
T-1952-A 8½"x11½"



©NATIONAL SAFETY COUNCIL

T-1953-B 17"x23"

ALTERNATE POSTERS FOR SEPTEMBER POSTING

(These posters may be ordered for immediate delivery)

©NATIONAL SAFETY COUNCIL

T-1480-C 25"x38"
T-1481-A 8½"x11½"

©NATIONAL SAFETY COUNCIL

T-1723-B 17"x23"

PRICES FOR ABOVE POSTERS

Traffic Posters—T-prefix to number	1-9	10-99	100-999	1000-4999*
A Size	$0.17	$0.12	$0.07	$0.06
B Size	.30	.20	.165	.132
C Size	.40	.30	.24	.22

YOUR CREDIT LINE can be imprinted at time of the press run on Traffic B and C posters only. Orders for imprints on September posters above must be received by July 10, 1960.

Imprinting charges for these posters are $2.25 per lot plus an initial charge for each electroplate of $21.00 for C poster imprint and $12.50 for B poster imprint.

*Write for prices on quantities of 5,000 or more for special rates on annual poster orders.

PRICES SHOWN ARE SUBJECT TO A DISCOUNT OF 10% TO NATIONAL SAFETY COUNCIL MEMBERS

FLEET POSTERS

POSTER PRICES

Posters illustrated on these pages are included in the automatic Motor Transportation poster services. Automatic poster sets are available on yearly subscription that provides (4) subjects per month viz. (2) "A" size (8½"x11½") and (2) "B" size (17"x23"). Automatic service is provided in the following categories:

City Truck Intercity Truck Sales Truck Truck Terminal	City Bus Intercity Bus Taxicab Bus Terminal	Annual price 1-4 sets, $9.90; 5-49, $7.80; 50 or more, $6.44.

Posters are available for individual selection at the following prices:

	1-9	10-99	100-999	1000-4999*
A size, any selection	.17	.12	.07	.06
B size, any selection	.32	.23	.195	.155

All prices shown are subject to a 10% discount to National Safety Council Members. *Write for prices on quantities of 5,000 or more. See page 29 for prices of posters with T-prefix.

©NATIONAL SAFETY COUNCIL

V-1897-A 8½x11½

©NATIONAL SAFETY COUNCIL

1685-A 8½x11½

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1505-A 8½x11½

9526-B 17x23

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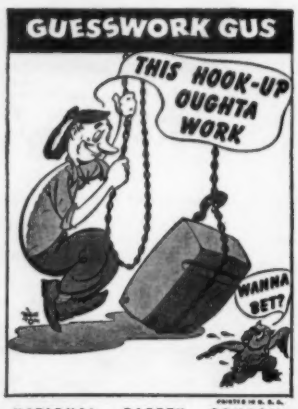
1599-B 17x23



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0381-B 17x23

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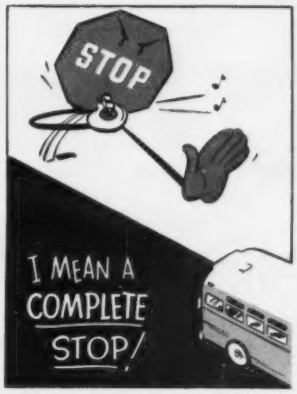

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V-9444-A 8½x11½

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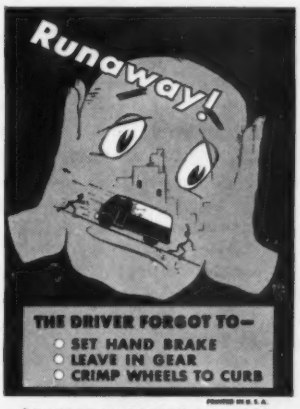

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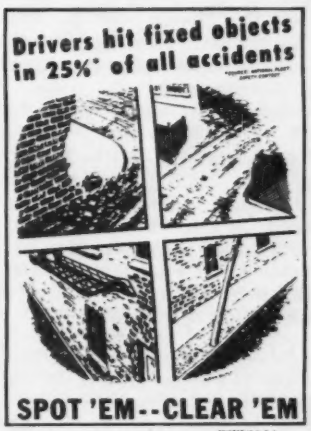

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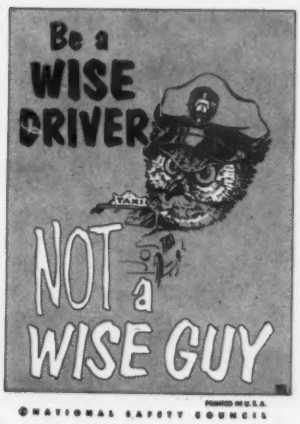
V-8822-A 8½x11½



V-1096-A 8½x11½

V-0218-B 17x23

Safety is a must for

PIPELINE ON WHEELS

by Albert J. Sziarto

SAFETY is a necessity in our organization.

We operate in excess of 1,500 pieces of over-the-road equipment, completing movements into 27 states. We maintain 25 terminals, and transport some 95 million gallons of over 200 different liquids a month. Our loads vary from 2,600 gallons of sulfuric acid trucked within Pennsylvania to 12,000 gallons of aviation gas in Michigan. At the present time we are extending and enlarging our bulk cement fleet which also utilizes tank trailers in its operation.

Our safety department consists of a director of safety, four full time safety engineers, and one driver-trainer assigned to each of our 15 strategically located terminals.

We have always felt within our organization that for a safety program to be effective we must consider with equal weight: driver selection and training, constant driver education, and effective truck maintenance through thorough vehicle inspection.

We sincerely feel that making these factors in our program equally important, has enabled us to attain for 1958 an accident frequency of .429 accidents per 100,000 vehicle miles traveled. Also, we traveled in excess of 30,000,000 miles last year, and our loss ratio factor was equally low for 1958.

In 1958 we felt that the I.C.C. vehicle inspection program was so effective that we adopted the program within our own organization. We made modifications to meet our particular requirements. We revised their driver-equipment compliance check form to fit our specific operation.

We adopted this inspection program for three reasons: 1) to determine the general compliance of vehicle maintenance at each of our terminals; 2) to prohibit or remove from the highway, whether loaded or empty, a vehicle with existing hazardous defects; and 3) to assist our terminal managers and shop foreman in better maintaining the vehicles within their jurisdiction by keeping them constantly on the alert for probable defects.

Keep in Top Shape

This inspection is performed on all our vehicles by our safety engineers and our driver-trainers, both at our terminals and on the road during the course of a movement. These inspections are never announced beforehand to anyone. This is necessary for the inspection to be fully effective. If a defect is noted on the unit, and in the opinion of the inspector it is serious enough to place the unit out-of-service, he is fully authorized to do so at the point of inspection. The unit then must be repaired or the defect corrected at that point before it is permitted to move.

I would like to list some of our standards which our units are required to meet, and which are used in the course of all our inspections including the driver-equipment compliance check.

Service (foot) brake: No leaks. (Leakage rate on unit with all brakes applied should not exceed five pounds per square inch per minute.) Brake chamber leaks, or brake chamber not securely mounted. Brake drums unevenly worn or badly scored or cracked. Linings worn to within 1/64 inch of the rivet or bolt head.

Parking (hand) brake: Any mechanical part of the parking brake missing, broken, or disconnected. Must lock the rear drive wheels. Must hold in the applied position without manual effort.

Hose, tubing and connections: Any brake hose which is worn, charred, cut, or cracked through the outer casing and through one ply of fabric, or with audible leak, bulge or restriction.

Steering mechanism: Lash of more than two inches or when wheels are incapable of being turned from full-right to full-left without jamming. Absence or looseness of bolts or positioning parts so as to permit motion of the steering column from its normal position, same as to the steering box attachment. Any looseness at any ball and socket joint in the steering linkage in excess of one-half inch measured in alignment with the shank or neck of the ball. Front wheel play about either a horizontal or vertical axis of either front wheel exceeds one inch measured at the tread surface of the tire.

Automotive breakaway: Must cause trailer brakes to lock. No leaks. Operative at 40 psi.

Air brake warning device: Operative between 50 to 70 psi, buzzer, light, or drop arm operative.

Albert J. Sziarto gave this address at the 47th Annual Safety Congress. At that time he was director of safety at E. Brooke Matlack, Inc., Philadelphia, Pa.

Springs: One-fourth or more of the leaves in leaf spring assemblies broken or missing, or the main leaf broken.

Any part of torsion bar or torsion bar assembly cracked, broken, or missing.

Coupling device: Any cracks or breaks. Play lengthwise exceeding one inch between the upper and lower fifth wheel halves. Mountings such as nuts, bolts, and brackets in good condition and tight.

Fuel system and tanks: Leakage at any point. Fill pipe without a cap.

Lights: head, stop, tail, front clearance, rear clearance, and side marker: Operative, no cracked or broken lens.

Reflector: Clean, not cracked or broken.

Wiring, connections, and ground: Good condition, no bare wires, good condition of switches.

Battery: Clean and covered.

Windows: No cracks or breaks, and operating satisfactorily.

Windshield wipers: Two in satisfactory operation.

Rear view mirror: Two, right and left, no cracks or breaks.

Defroster: Ability to heat windshield.

Horn: Two, air and electric, operating satisfactorily.

Tires: 5/32 inch tread depth front wheels, 2/32 inch tread depth drive and free rolling wheels. Tread cuts one inch or more and to body cords. Any rim, wheel, or wheel flange loose or cracked.

Exhaust: Securely fastened, no visible or audible leak above passenger or driver compartment.

Speedometer: Tachograph operating satisfactorily.

Sleeper berth: Clean and properly equipped.

Fire extinguisher: Four pound dry chemical or 1½ quart carbon tetrachloride full, and sealed.

Flags and Reflector flares: Three, clean and mounted.

Red electric lantern (Ohio and Mich.): Three, operative and mounted.

Tire chains: One set for at least one driving wheel on each side during winter (Nov. 1 to March 31).

Spare light bulbs: One for each type of light, in kit and mounted.

Spare electric fuses: One for each type where needed.

Hand tools: At least one screwdriver (mounted), to change light bulb.

Accident reporting kit: Complete with all required forms and instructions.

Driver's log: Current to last change of status, has 30 days' logs in driver possession.

Excess hours—Daily: Check driver's driving and on-duty time for possible violation.

Physical examination card: Must have in possession certificate of physical examination not over three years old.

How maintained (log): Shows all points, mileages, dates, etc.

Weekly: Check violations in 168 hour period.

Operators license: Obtain license number from card, check card for suspension or revocation.

Proper marking of cargo tank: Check for proper marking on sides and rear. (Flammable, compressed gas, corrosive, acid, etc.)

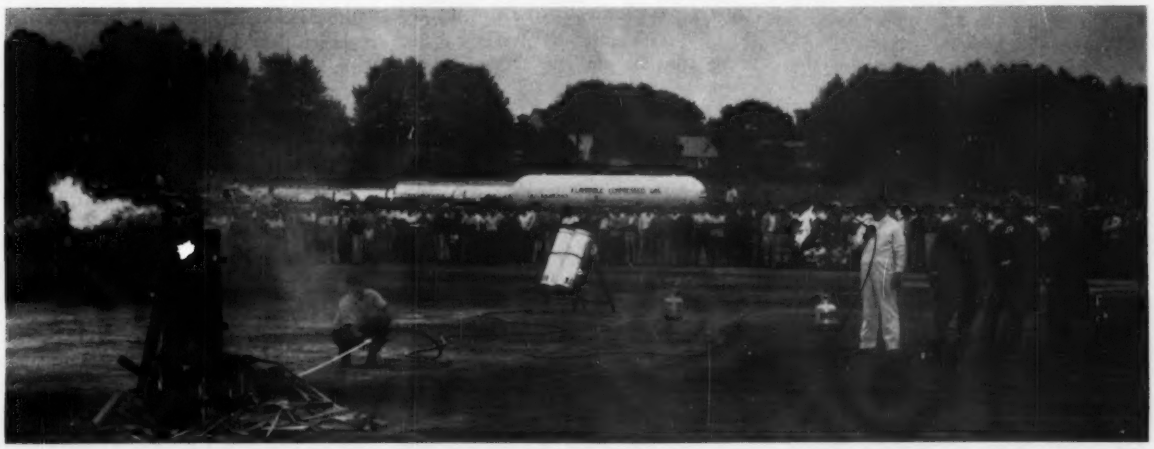
Certificate of lease: All leased vehicles must carry (bolted to door) copy of lease certificate.

Safety valves: Check operative condition, cables tight, not rusted or broken, required on all flammable liquid tanks.

Specification plate: Must be equipped with metal plate containing information identifying tank by number, type, and size.

Bill of lading number: Obtain to check on movement.

If in the course of an inspection a defect is found, the white copy or original of this form is given to the driver. He is advised to turn it in to his terminal manager, who in turn has the defect corrected and returns the stub at the bottom of the form to the safety department signifying that all defects have been corrected. We have authorized the safety engineers of our insurance carrier to complete a similar



Drivers watch demonstration of operation of relief valve under pressure when live cylinder of propane is fired. Men must understand the nature of materials they carry, know what to do in an emergency.

inspection of all of our units on the highway.

Although I feel that this check plays a vital role in our vehicle inspection and maintenance program, there are other inspections that are performed on all our units. Namely, 1) a vehicle inspection of the entire unit by the driver before he begins his tour of duty; 2) a written report of vehicle condition submitted by the driver, completed by him, at the end of his tour of duty each day; 3) an inspection over a grease pit of each unit from stem to stern, each week, covering steering, brakes, air hose, lights, spring shackles, U-bolts, etc. again being guided by the established standards, and 4) once every 90 days every vehicle in our operation is checked over the grease pit and a detailed account of the inspection is made of permanent record.

It is interesting to note that within my home state of Pennsylvania, where an official vehicle inspection program has been in effect since 1929, almost 60 per cent of the vehicles are rejected on the first inspection each period. Deficient lights, brakes, steering gear, and mufflers are in that order the most frequent reasons for rejection. In New Jersey where an official vehicle inspection program has been in effect since 1938, about 35 per cent of the vehicles are rejected on the first inspection each period.

Big Factor

We at Matlack agree with many inspection officials and motor vehicle administrators that 20 per cent is a fair and conservative estimate of the average number of vehicles involved in accidents which have mechanical deficiencies *causing* the accidents. Of course accurate statistics on the number of vehicles with defects that are involved in accidents are not available due to the limitations of the accident reporting procedure throughout the nation. In fatal accidents, the reported percentage has ranged from 2 to 15 per cent in various states.

I firmly believe that truck maintenance can be improved greatly by an effective inspection program. However, I don't believe that there is any one answer, or any one single approach to the accident prevention problem. It is impossible to state that a reduction in the traffic accident frequency can be attributed solely to better maintenance, better driver selection and training, or to any other one particular activity. Even though I would be among the first to admit that good truck maintenance through an efficient inspection program is essential, I would still say that it is only one of the many activities which are necessary to an integrated attack on the traffic accident problem.

Of course the basic purpose we have for performing our various inspections is to discover any maladjustments in our vehicles that might potentially lead to accidents. By bringing them immediately to the attention of our ship personnel at our terminals, we feel we have prevented many accidents on and off the highway.

Here's the Payoff

We derive six major benefits from our vehicle inspection program:

1. It improves the general overall standard of vehicle condition — thus greatly reducing the accident potential.
2. It maintains our vehicles at a higher monetary value level by lessening depreciation.
3. It affords us an opportunity to check the driver's operation of the vehicle together with his knowledge of the unit.
4. It improves the quality of our shop workmanship in making adjustments and repairs.
5. It provides an excellent opportunity for informing our drivers of the condition of their vehicles and their responsibility for driving safely.
6. It assures us of rendering the most efficient possible service to our shippers and customers.

We are enthusiastic about our inspection program because it has produced so much for us. I feel that inspection and maintenance go hand-in-hand, and I emphasize the need for an effective enforceable inspection program as a means toward the improvement of the safety effort and record.

My company also realizes that we carry a constant and tremendous responsibility to the public, who uses the highways with us.

In the final analysis, our safety program is a dollars and cents proposition. For the record, we are now paying the lowest insurance rate of all petro-chemical carriers in the nation.

PRESIDENT PROCLAIMS SAFE BOATING WEEK

President Dwight D. Eisenhower has proclaimed National Safe Boating Week for July 3-9, urging the 40 million Americans who go boating to follow safe boating practices and exercise courtesy on the waterways.

The National Safety Council, through its Public Safety Department, directed by staff member Ralph Kuhli, is co-sponsoring this effort with 13 other organizations. These include: American Boat and Yacht Council, Inc.; American National Red Cross; American Yachtsmen's Association; National Council of Boy Scouts of America; Girl Scouts of the United States of America; National Association of Engine and Boat Mfgrs.; National Association of Marine Dealers; National Safe Boating Association; Outboard Boating Club of America; United States Coast Guard; United States Coast Guard Auxiliary; United States Power Squadrons, and the Yacht Safety Bureau, Inc.

Attorneys Adopt Safety Resolution

In winding up its Miami Beach meeting—which had been specifically devoted to traffic law enforcement and the problems of accident prevention—the National District Attorneys Association passed a resolution which urged the attorneys to become an effective deterrent force to "Murder by Motor."

The resolution urged all prosecuting officials to examine every traffic fatality for possible homicide charges; to expand the use of chemical tests for intoxication, and to adopt a more vigorous educational program to make traffic judges and juries acutely aware of the value of such chemical tests.

It also recommended that more prosecuting attorneys and judges be assigned to traffic courts, and that each prosecutor should make effective use of all available legal and scientific aids and keep abreast of the latest developments.

Mason & Dixon Lines Wins Top Honor In National Truck Safety Contest

Mason & Dixon Lines, Inc., of Kingsport, Tenn., has been named the trucking firm with the best overall safety record in the trucking industry for 1959.

Mason & Dixon Lines received the American Trucking Association President's Trophy—highest honor in the annual ATA National Truck Safety Contest. The trophy, sponsored by Trailmobile, Inc., of Cincinnati, Ohio, is awarded to the trucking firm with the most outstanding and effective safety program. Activities in general safety promotion not directly related to the operation of the trucking company also are considered in making the award.

Mason & Dixon also won a first place, a second place and a third place award in different categories of the contest. A trophy is given for placing first in a category, while plaques are given for second and third place.

High honors in the contest also were won by Dixie Highway Express, Inc., of Meridian, Miss., and ABC Movers, Inc., of Baltimore. ABC Movers captured three first place awards, while Dixie Highway Express took two first place awards and one third place.

The contest is divided into several categories on the basis of type of commodity hauled, the number of miles traveled and whether service is local, over-the-road or both.

The safety directors of 25 companies which placed first in the different divisions of the contest received special personal awards from the Electric Auto-Lite Co., of Toledo, Ohio, in recognition of their success in promoting safety among their drivers.

The Pennsylvania Motor Truck Association was named for the second successive year as the state association which did the most effective job of promoting highway safety on the part of trucks during 1959. In a repetition of last year's standings, the Michigan Trucking Association, Inc., took second place and the Ohio Trucking Association, third place. Certificates of merit were awarded to the Kansas and North Carolina Motor Carriers Associations.

Sponsored annually by ATA, the contest is designed to foster safe operation of trucks on the nation's streets and highways through competition between truck fleets and to give recognition to successful accident prevention programs.

Ceremonies honoring the winners were held at the annual safety awards banquet May 12—the concluding event of the annual three-day spring meeting of the ATA Council of Safety Supervisors at the Beverly-Hilton Hotel in Los Angeles.

PINKERTON PATROL

Several midwest trucking companies now have famous Pinkerton detectives patroling the highways to see that their drivers obey regulations.

"Something had to be done to fight accidents and pilfering, and we're hoping this will be the solution," said W. E. McCarron, general manager of the Illinois Truck Operators Association.

McCarron said that these problems have reached such proportions that casualty companies are reluctant to accept motor carriers.

Detectives will watch for drivers who speed, pass on curves, hog the road and carry passengers against company rules.

Truckers say the service won't simply duplicate the job of the state police. The Pinkerton men will not only watch for law violations, they will be on the look-out for violations of company regulations as well.

The National Community Vehicle Safety-Check Program kick-off was made at the Seventh Annual Western Safety Congress and Exhibits in Los Angeles. Photographed at the opening are (l. to r.) M. R. Darlington, Jr., managing director, Auto Industries Highway Safety Committee; actress Jane Powell, who was named "Miss Safety-Check—1960"; actor John Vivyan, who portrays "Mr. Lucky" on the CBS television network, and who will represent the National Safety Council in national publicity for the program, and James T. Blalock, president, Greater Los Angeles Chapter, NSC, which annually presents the Western Safety Congress and Exhibits.

Rumbles Cut Violations

WHEN a countywide survey revealed that the incidence of stop sign violations in rural and semi-rural areas ran as high as 62 per cent, engineers in the Cook County (Ill.) Highway Department decided to do something about it. It appeared to them that most of the stop sign violations were unintentional. The drivers, for some reason or other, failed to see the signs. If the signs weren't seen, they thought, maybe it would help if they were heard.

The engineers began applying "rumbler" pavement on the traffic lane approaching a stop sign. When a car hits the pavement, an audible rumble warns the driver to be alert.

Spot checks since installation of the rumbler strips have shown a noticeable reduction in the number of stop sign violations.

For rumbler aggregate the department uses 1-inch screened slag precoated with asphaltic liquid. The binder is petroleum asphalt with a penetration of 100-120. One rumbler strip, one lane wide and 300 feet long, requires nine tons of aggregate and 116 gallons of asphalt. The formula is economical and gives good wear.

Wet Weather Warnings

You don't save lives in traffic by being subtle. This fact was demonstrated recently by the Metropolitan Area Traffic Council of Washington, D. C., which dramatically improved the capitol's rainy weather safety record by the simple expedient of telling the public, "It's raining."

When a rash of traffic casualties in fog, rain and darkness was climaxed by five traffic fatalities in a five hour period in the metropolitan area, the council decided to try a warning system similar to the snow emergency warning system already in use. All participating agencies were consulted and the system quickly whipped into shape.

The U.S. Weather Bureau offered to cooperate by providing its short range forecasts and by adding the warning of anticipated bad driving conditions to its local forecast.

Less than a week later the rains came again — and with them the familiar accompaniment of fog and dusk—striking just as the main body of government workers started their trek homeward.

The warning system swung into action. By radio, TV, telephone and word of mouth, people were told, "Be careful. Stay home, if possible." The local automobile clubs alerted their emergency crews and police departments flashed the warning.

The heads of the member jurisdictions of the Metropolitan Area Traffic Council alerted their personnel. Bus companies told their chauffeurs, "Drive with care."

Like its predecessor, the storm raged for five hours, but this time no fatalities occurred. It seems it pays to tell people it's raining.

First Aid Training For Michigan Employes

The first phase of a Michigan State Highway Department program to give first aid training to most of its 4,000 employes was completed recently.

Nine highway department employes from all sections of the state completed a first aid instructor course and will now start first aid training classes in seven of the department's 10 districts.

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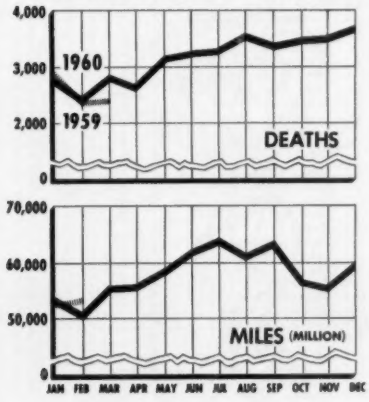
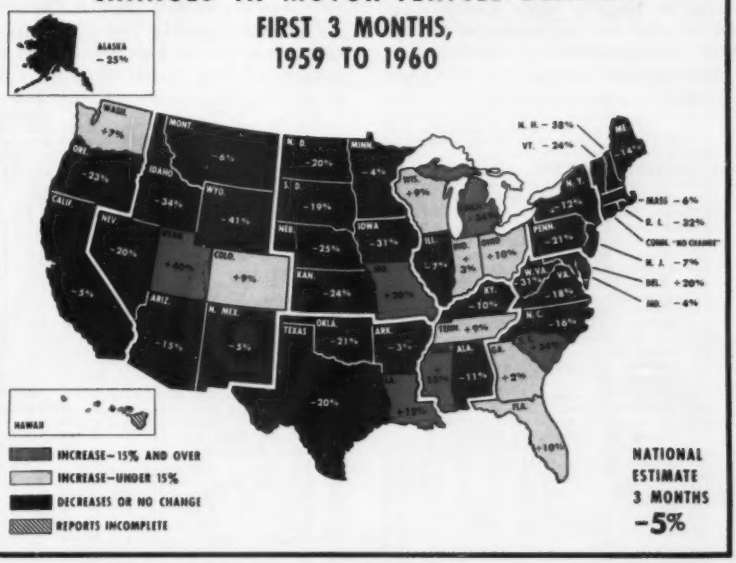
tion group at the end of three months, ranked according to the number of deaths per 10,000 registered vehicles were:

	Reg. Rate	Pop. Rate
Group I (Over 1,000,000)		
Chicago, Ill.	1.8	4.8
Philadelphia, Pa.	3.0	7.3
Detroit, Mich.	3.2	10.8
Group II (750,000 to 1,000,000)		
St. Louis, Mo.	1.9	7.0
Washington, D. C.	3.4	9.0
Cleveland, Ohio	3.9	12.1
Group III (500,000 to 750,000)		
Milwaukee, Wis.	1.4	6.2
Buffalo, N. Y.	1.6	6.0
Houston, Tex.	1.8	10.7
Group IV (250,000 to 500,000)		
Denver, Colo.	1.6	9.3
Birmingham, Ala.	1.7	6.7
Portland, Ore.	2.0	11.6
Group V (200,000 to 350,000)		
Grand Rapids, Mich.	0.0	0.0
Toledo, Ohio	0.3	1.2
Miami, Fla.	0.6	4.6
Group VI (100,000 to 200,000)		
Trenton, N. J.	0.0	0.0
Rockford, Ill.	0.0	0.0
Hartford, Conn.	0.0	0.0
Group VII (50,000 to 100,000)		
Topeka, Kan.	0.0	0.0
Santa Ana, Calif.	0.0	0.0
Torrance, Calif.	0.0	0.0
Group VIII (25,000 to 50,000)		
Tyler, Tex.	0.0	0.0
Midland, Tex.	0.0	0.0
Yakima, Wash.	0.0	0.0
Group IX (10,000 to 25,000)		
Boulder, Colo.	0.0	0.0
Mesa, Ariz.	0.0	0.0
Santa Cruz, Calif.	0.0	0.0

MONTHLY MOTOR VEHICLE DEATHS AND TRAFFIC TRENDS 1959-1960



CHANGES IN MOTOR-VEHICLE DEATHS
FIRST 3 MONTHS, 1959 TO 1960



MOTOR VEHICLE DEATHS AND CHANGES

Months	DEATHS				PERCENTAGE CHANGES				
					Corresponding Month			4 Mos. Mov. Ave.*	
	1956	1958	1959	1960	1956-1960	1958-1959	1959-1960	1958-1959	1959-1960
January	2,954	2,709	2,790	2,900	— 2%		+ 4%		0%
February	2,652	2,398	2,430	2,380	—10%		— 2%		+ 1%
March	2,940	2,598	2,860	2,400	—18%		—16%		— 3%
3 Months	8,546	7,705	8,080	7,680	—10%		— 5%		
April	2,970	2,595	2,650			+ 2%		+ 4%	
May	3,094	2,937	3,110			+ 6%		+ 5%	
June	3,338	3,078	3,260			+ 6%		+ 6%	
July	3,555	3,098	3,250			+ 5%		+ 5%	
August	3,535	3,550	3,510			— 1%		+ 4%	
September	3,653	3,325	3,360			+ 1%		+ 3%	
October	3,476	3,586	3,440			— 4%		0%	
November	3,603	3,526	3,490			— 1%		— 1%	
December	3,858	3,581	3,650			+ 2%		— 1%	
Total	39,628	36,981	37,800						

All 1956 and 1958 figures are from the National Office of Vital Statistics. The 1959 and 1960 figures are National Safety Council estimates.

The 1960 national estimate is arrived at by assuming that the percentage change from 1959 to 1960 in the states reporting for both years reflects the 1959-1960 change in the entire country. First reports are preliminary, so revisions are made from time to time as later reports are received for the various months. Thus, figures above for 1960 may differ slightly from figures for the same months which will be published in future issues of TRAFFIC SAFETY.

*Four Months Moving Average is based on changes between the totals for four months instead of one month. For example, the March figure shows the change between the totals for December-March 1959 and December-March 1960, etc. Adding several months together tends to smooth out single month changes which may be affected by differences in the number of weekends in a month from one year to the next, random variations, etc.

TRAFFIC DEATHS—CITY RECORDS

The table covers only motor-vehicle deaths resulting from traffic accidents that occurred in the city. Nontraffic motor-vehicle deaths (where the accident occurred on home or work premises) are not included nor are deaths in the city from accidents occurring outside.

Rankings are based on the 1960 registration death rate which is the number of deaths per 10,000 registered motor vehicles on an annual basis. Vehicle registration figures are for the year 1959 and were supplied by R. L. Polk & Compny.

Cities are ranked by registration death rates—from low to high. When two or more cities have exactly the same rate, ranking is by total vehicle registrations—from large to small.

Cities shown in heavy type have improved in 1960 compared with 1959.

The population death rate is the number of deaths per 100,000 population on an annual basis. Populations are as of April, 1950, or later censuses taken by the U. S. Bureau of the Census.

	Three Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
ALL REPORTING CITIES				2.2	6.8
Group I (1,000,000 and over)					
1. Chicago, Ill.	45	58	67	1.8	4.8
2. Philadelphia, Pa.	58	36	40	3.0	7.3
3. Detroit, Mich.	52	35	31	3.2	10.8
All cities in this group				3.3	8.9
4. Los Angeles, Calif.	115	81	82	3.8	20.5
5. New York, N. Y.	134	196	170	3.9	6.9
6. Baltimore, Md.	33	26	32	4.1	12.8
Group II (750,000 to 1,000,000)					
1. St. Louis, Mo.	15	26	16	1.9	7.0
All cities in this group				3.3	10.7
2. Washington, D. C.	19	16	10	3.4	9.0
3. Cleveland, Ohio	28	26	23	3.9	12.1
4. San Francisco, Calif.	29	25	21	4.0	15.0
Group III (500,000 to 750,000)					
1. Milwaukee, Wis.	11	13	12	1.4	6.2
2. Buffalo, N. Y.	9	15	17	1.6	6.0
3. Houston, Tex.	19	31	22	1.8	10.7
4. Seattle, Wash.	13	13	17	1.8	9.0
All cities in this group				2.3	9.9
5. Minneapolis, Minn.	13	10	6	2.6	10.0
6. Cincinnati, Ohio	15	13	11	2.7	10.4
7. Dallas, Tex.	22	13	17	2.9	15.1
8. Pittsburgh, Pa.	15	15	21	3.0	8.8
9. San Diego, Calif.	16	23	25	3.2	12.8
10. New Orleans, La.	17	15	14	3.8	11.3
Group IV (350,000 to 500,000)					
1. Denver, Colo.	11	12	10	1.6	9.3
2. Birmingham, Ala.	6	13	15	1.7	6.7
3. Portland, Ore.	12	16	11	2.0	11.6
4. Memphis, Tenn.	9	7	5	2.1	7.4
5. Atlanta, Ga.	10	18	19	2.1	8.1
6. Oakland, Calif.	9	15	9	2.3	9.4
7. Indianapolis, Ind.	13	8	8	2.3	11.3
All cities in this group				2.6	11.2
8. Louisville, Ky.	11	14	12	2.8	10.8
9. San Antonio, Tex.	22	11	13	4.1	19.3
10. Kansas City, Mo.	21	11	10	5.4	17.5
Group V (200,000 to 350,000)					
1. Grand Rapids, Mich.	0	6	4	0.0	0.0
2. Toledo, Ohio	1	2	4	0.3	1.2
3. Miami, Fla.	3	17	14	0.6	4.6
4. Wichita, Kan.	2	2	1	0.6	3.6
5. Providence, R. I.	3	3	3	0.9	4.8
6. Omaha, Neb.	3	7	8	1.0	4.3
7. El Paso, Tex.	3	16	11	1.4	4.8
8. Flint, Mich.	4	1	3	1.5	7.4
9. Dayton, Ohio	6	4	5	1.6	8.0
10. Rochester, N. Y.	6	3	5	1.7	6.9
All cities in this group				1.9	9.1
11. Fort Worth, Tex.	8	11	9	2.0	9.7
12. Worcester, Mass.	3	4	5	2.1	5.9
13. Oklahoma City, Okla.	10	7	7	2.2	14.0
14. St. Paul, Minn.	8	5	7	2.3	10.2
15. Syracuse, N. Y.	5	1	1	2.6	9.3
16. Norfolk, Va.	6	1	6	2.6	8.2
17. Akron, Ohio	9	9	11	2.8	11.7
18. Honolulu, Hawaii	11	12	8	2.9	17.7
19. Richmond, Va.	9	5	7	3.0	15.2
20. Tampa, Fla.	11	6	7	3.2	16.3
21. Long Beach, Calif.	19	8	7	4.9	22.6
Group VI (100,000 to 200,000)					
1. Trenton, N. J.	0	3	4	0.0	0.0
2. Rockford, Ill.	0	2	0	0.0	0.0
3. Hartford, Conn.	0	0	0	0.0	0.0
4. Lincoln, Neb.	0	0	1	0.0	0.0
5. Niagara Falls, N. Y.	0	1	2	0.0	0.0
6. Utica, N. Y.	0	0	0	0.0	0.0
7. New Haven, Conn.	1	3	3	0.4	2.4
8. Canton, Ohio	1	0	4	0.6	3.2
9. Arlington, Va.	1	3	1	0.6	2.5
10. Wilmington, Del.	1	0	0	0.7	3.6
11. Saginaw, Mich.	1	0	0	0.7	3.7
12. Yonkers, N. Y.	1	0	1	0.7	2.2
13. Madison, Wis.	1	0	0	0.7	3.6
14. Roanoke, Va.	1	0	1	0.9	4.0
15. Fresno, Calif.	2	5	1	1.0	6.5
16. Austin, Tex.	2	6	2	1.1	4.9
17. Erie, Pa.	2	0	1	1.2	5.8
18. Chattanooga, Tenn.	2	4	6	1.2	6.1
19. Peoria, Ill.	2	0	1	1.3	7.0
20. Spokane, Wash.	3	2	3	1.3	6.4
21. Lansing, Mich.	2	1	2	1.3	7.1
22. Montgomery, Ala.	2	1	2	1.5	6.9
23. Berkeley, Calif.	2	3	4	1.6	6.8
24. Des Moines, Iowa	4	3	5	1.7	8.7
25. Gary, Ind.	3	3	3	1.8	6.8
26. South Bend, Ind.	3	1	1	1.8	9.1
27. Duluth, Minn.	2	2	5	1.8	7.6
28. Albuquerque, N. M.	4	7	4	1.9	9.4
29. Fort Wayne, Ind.	4	5	4	2.0	10.4
30. Waterbury, Conn.	2	1	1	2.0	7.0
31. Jackson, Miss.	3	6	0	2.1	10.2
32. Baton Rouge, La.	4	5	6	2.1	10.6
All cities in this group				2.1	10.3
33. Lubbock, Tex.	3	5	1	2.2	11.4
34. Hammond, Ind.	2	7	2	2.2	7.3
35. Kansas City, Kan.	4	5	0	2.2	12.3
36. Little Rock, Ark.	3	1	3	2.3	11.2
37. Pasadena, Calif.	4	5	5	2.4	14.0
38. Youngstown, Ohio	4	2	5	2.4	8.6
39. Evansville, Ind.	4	6	1	2.5	9.5
40. Allentown, Pa.	3	1	0	2.5	10.7
41. Shreveport, La.	5	3	2	2.6	12.4
42. Dearborn, Mich.	5	4	13	2.6	15.4
43. Amarillo, Tex.	4	3	2	2.8	15.9
44. Glendale, Calif.	4	3	4	2.9	14.0
45. Savannah, Ga.	4	1	3	2.9	12.2
46. San Jose, Calif.	8	10	6	3.0	20.2
47. Elizabeth, N. J.	3	1	3	3.1	10.2
48. Salt Lake City, Utah	10	5	5	3.1	20.8
49. Nashville, Tenn.	7	3	9	3.3	16.1
50. Corpus Christi, Tex.	6	2	8	3.3	16.5
51. Phoenix, Ariz.	11	12	11	3.5	27.5
52. Sacramento, Calif.	10	4	4	3.6	25.4
53. Tacoma, Wash.	8	4	4	3.7	20.3
54. Newport News, Va.	3	1	4	3.8	11.5
55. Bridgeport, Conn.	6	2	0	3.9	14.2
56. Waco, Tex.	5	2	3	4.3	19.8
57. Mobile, Ala.	8	10	8	4.6	18.4
58. St. Petersburg, Fla.	14	11	2	5.3	42.2
Group VII (50,000 to 100,000)					
1. Topeka, Kan.	0	3	3	0.0	0.0
2. Santa Ana, Calif.	0	3	0	0.0	0.0
3. Torrance, Calif.	0	5	1	0.0	0.0
4. Schenectady, N. Y.	0	0	1	0.0	0.0
5. Pontiac, Mich.	0	0	5	0.0	0.0
6. Colorado Spgs., Colo.	0	1	1	0.0	0.0
7. Alexandria, Va.	0	2	1	0.0	0.0
8. Springfield, Ohio	0	4	2	0.0	0.0
9. Wichita Falls, Tex.	0	1	1	0.0	0.0
10. Cedar Rapids, Iowa	0	0	3	0.0	0.0
11. Columbus, Ga.	0	2	0	0.0	0.0
12. Sioux City, Iowa	0	8	3	0.0	0.0
13. Lexington, Ky.	0	2	2	0.0	0.0
14. Reno, Nev.	0	0	1	0.0	0.0
15. Jackson, Mich.	0	1	0	0.0	0.0
16. Bethlehem, Pa.	0	0	0	0.0	0.0
17. San Mateo, Calif.	0	0	2	0.0	0.0
18. Asheville, N. C.	0	0	0	0.0	0.0
19. Lake Charles, La.	0	1	3	0.0	0.0
20. Battle Creek, Mich.	0	1	0	0.0	0.0
21. Evanston, Ill.	0	0	0	0.0	0.0
22. Anderson, Ind.	0	1	0	0.0	0.0
23. Mansfield, Ohio	0	0	2	0.0	0.0
24. St. Clair Shrs., Mich.	0	0	1	0.0	0.0
25. Lorain, Ohio	0	1	1	0.0	0.0
26. White Plains, N. Y.	0	0	0	0.0	0.0
27. Cambridge, Mass.	0	0	3	0.0	0.0
28. Alameda, Calif.	0	1	0	0.0	0.0
29. Hampton, Va.	0	3	7	0.0	0.0
30. Wheeling, W. Va.	0	0	3	0.0	0.0
31. Council Bluffs, Iowa	0	2	2	0.0	0.0
32. Elmira, N. Y.	0	0	0	0.0	0.0
33. Euclid, Ohio	0	0	1	0.0	0.0
34. Medford, Mass.	0	0	0	0.0	0.0
35. Cuyahoga Falls, Ohio	0	0	0	0.0	0.0
36. Bloomfield, N. J.	0	0	0	0.0	0.0
37. Passaic, N. J.	0	2	0	0.0	0.0
38. West Hartford, Conn.	0	1	0	0.0	0.0
39. West Allis, Wis.	0	1	1	0.0	0.0
40. Greenwich, Conn.	0	2	1	0.0	0.0
41. Fort Lauderdale, Fla.	1	1	3	0.8	6.4
42. Beaumont, Tex.	1	5	1	0.8	4.3
43. Pueblo, Colo.	1	7	0	0.9	4.8
44. Winston-Salem, N. C.	1	2	2	0.9	4.4
45. Decatur, Ill.	1	1	6	0.9	5.1
46. Las Vegas, Nev.	1	1	0	1.0	7.5
47. Kalamazoo, Mich.	1	0	2	1.0	5.3
48. Orlando, Fla.	2	1	0	1.1	9.0
49. Binghampton, N. Y.	1	1	1	1.1	4.8
50. Newton, Mass.	1	3	1	1.1	4.6
51. Huntington, W. Va.	1	3	2	1.1	4.6
52. San Leandro, Calif.	1	1	1	1.2	6.3
53. Warren, Ohio	1	3	1	1.2	6.3
54. Greenville, S. C.	1	0	1	1.2	6.2
55. Santa Monica, Calif.	1	1	3	1.2	5.2
56. Johnstown, Pa.	1	1	1	1.2	6.3
57. Pomona, Calif.	1	2	3	1.3	6.4
58. Kenosha, Wis.	1	4	0	1.3	6.2
59. Muskegon, Mich.	1	0	1	1.3	7.0
60. Aurora, Ill.	1	0	1	1.3	6.9
61. Bay City, Mich.	1	1	0	1.3	6.6
62. St. Joseph, Mo.	1	0	1	1.3	5.1
63. Charleston, W. Va.	1	1	1	1.4	5.4
64. Mount Vernon, N. Y.	1	3	0	1.4	5.3
65. Portland, Maine	1	1	0	1.4	5.0
66. East Orange, N. J.	1	0	2	1.4	4.7
67. Pawtucket, R. I.	1	1	0	1.5	4.6
68. Lakewood, Calif.	1	1	2	1.5	5.6
69. Portsmouth, Va.	1	2	0	1.5	4.7
70. San Angelo, Tex.	1	3	0	1.5	7.3
71. New Rochelle, N. Y.	1	1	1	1.5	5.4
72. Covington, Ky.	1	1	1	1.6	5.5
All cities in this group				1.6	7.6
73. Fort Smith, Ark.	1	3	4	1.6	6.7
74. Oak Park, Ill.	1	0	1	1.7	6.5
75. Fullerton, Calif.	1	0	0	1.7	7.9
76. Springfield, Ill.	2	1	2	1.7	9.8
77. Riverside, Calif.	2	2	2	1.8	10.6
78. Irvington, N. J.	1	0	0	1.8	6.4
79. Lwr. Merion Twp., Pa.	1	1	1	2.0	6.9
80. Pittsfield, Mass.	1	1	2	2.0	7.2
81. San Bernardino, Calif.	3	5	4	2.1	14.4
82. Stockton, Calif.	3	8	2	2.1	15.7
83. Abilene, Tex.	2	3	1	2.1	13.2
84. Hayward, Calif.	2	3	0	2.1	14.6
85. Waltham, Mass.	1	0	1	2.2	8.0
86. Meriden, Conn.	1	3	1	2.2	7.8
87. Pensacola, Fla.	2	0	2	2.2	15.7
88. Terre Haute, Ind.	2	0	1	2.2	11.0
89. Durham, N. C.	2	3	2	2.3	11.2
90. Woonsocket, R. I.	1	0	0	2.3	8.0
91. Raleigh, N. C.	2	0	1	2.3	11.3
92. Wilkes-Barre, Pa.	2	1	3	2.3	10.4
93. Davenport, Iowa	2	2	0	2.3	9.9
94. Lancaster, Pa.	2	2	0	2.3	11.8
95. Brookline, Mass.	1	1	2	2.4	7.0
96. Waterloo, Iowa	2	0	5	2.4	11.4
97. Columbia, S. C.	3	1	1	2.4	12.5
98. Burbank, Calif.	3	4	2	2.5	13.2
99. Miami Beach, Fla.	2	4	1	2.5	15.7
100. Sioux Falls, S. D.	2	3	0	2.7	13.4
101. Ann Arbor, Mich.	2	0	1	2.8	14.7
102. Lynn, Mass.	2	2	2	3.1	8.1
103. New Britain, Conn.	2	0	1	3.1	9.2
104. Royal Oak, Mich.	3	2	1	3.2	16.8
105. Santa Barbara, Calif.	3	1	1	3.2	21.5
106. Lakewood, Ohio	2	0	1	3.3	11.3
107. Macon, Ga.	4	4	0	3.6	22.8
108. Bayonne, N. J.	2	1	1	3.6	10.4
109. Tucson, Ariz.	5	6	2	3.6	28.6
110. Dubuque, Iowa	2	0	0	3.7	15.6
111. Lynchburg, Va.	2	1	1	3.8	15.0
112. Tuscaloosa, Ala.	2	2	1	3.8	14.1
113. Springfield, Mo.	4	1	0	3.8	20.1
114. Norwalk, Conn.	2	2	0	4.0	13.1
115. Greensboro, N. C.	4	3	4	4.0	19.7
116. Parma, Ohio	2	0	0	4.0	10.9

	Three Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
117. Lincoln Park, Mich...	2	1	2	4.1	14.8
118. Anaheim, Calif.	**5**	**7**	**0**	**4.1**	**25.5**
119. Gadsden, Ala.	2	1	2	4.4	12.4
120. Stamford, Conn.	4	0	2	4.4	18.3
121. Atlantic City, N. J.	2	1	2	4.5	13.0
122. Augusta, Ga.	4	1	0	4.6	21.5
123. Compton, Calif.	**4**	**5**	**4**	**4.6**	**25.1**
124. Brockton, Mass.	3	1	3	5.1	19.1
125. Charleston, S. C.	3	0	2	5.8	17.1
126. Warren, Mich.	5	4	2	5.9	31.5
127. Ogden, Utah	6	1	1	6.4	36.8

Group VIII (25,000 to 50,000)

1. Tyler, Tex.	**0**	**2**	**0**	**0.0**	**0.0**
2. Midland, Tex.	0	0	2	0.0	0.0
3. Yakima, Wash.	0	0	0	0.0	0.0
4. Wyandotte, Mich.	0	0	1	0.0	0.0
5. Modesto, Calif.	0	0	3	0.0	0.0
6. Cheyenne, Wyo.	0	0	0	0.0	0.0
7. Casper, Wyo.	0	0	0	0.0	0.0
8. Kokomo, Ind.	0	0	0	0.0	0.0
9. Whittier, Calif.	0	0	0	0.0	0.0
10. Everett, Wash.	**0**	**1**	**0**	**0.0**	**0.0**
11. Pasadena, Tex.	0	0	2	0.0	0.0
12. Plainfield, N. J.	0	0	1	0.0	0.0
13. Lafayette, Ind.	**0**	**1**	**0**	**0.0**	**0.0**
14. Beverly Hills, Calif.	**0**	**2**	**1**	**0.0**	**0.0**
15. Appleton, Wis.	**0**	**3**	**0**	**0.0**	**0.0**
16. Wilmington, N. C.	**0**	**2**	**0**	**0.0**	**0.0**
17. Hutchinson, Kan.	0	0	1	0.0	0.0
18. Salina, Kan.	0	0	1	0.0	0.0
19. Newark, Ohio	0	0	2	0.0	0.0
20. Quincy, Ill.	**0**	**3**	**2**	**0.0**	**0.0**
21. Elyria, Ohio	0	0	0	0.0	0.0
22. Rock Island, Ill.	0	0	0	0.0	0.0
23. La Crosse, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
24. Lawton, Okla.	**0**	**1**	**0**	**0.0**	**0.0**
25. Easton, Pa.	0	0	0	0.0	0.0
26. Richmond, Ind.	0	0	1	0.0	0.0
27. Zanesville, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
28. Pine Bluff, Ark.	0	0	1	0.0	0.0
29. Rochester, Minn.	0	0	2	0.0	0.0
30. Pocatello, Idaho	**0**	**2**	**6**	**0.0**	**0.0**
31. University City, Mo.	0	0	1	0.0	0.0
32. Oshkosh, Wis.	0	0	1	0.0	0.0
33. Highland Pk., Mich.	**0**	**2**	**2**	**0.0**	**0.0**
34. Eau Claire, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
35. Stratford, Conn.	**0**	**1**	**1**	**0.0**	**0.0**
36. Coral Gables, Fla.	0	0	1	0.0	0.0
37. Marion, Ohio	**0**	**1**	**1**	**0.0**	**0.0**
38. Portsmouth, Ohio	0	0	0	0.0	0.0
39. Montebello, Calif.	0	0	1	0.0	0.0
40. Ventura, Calif.	**0**	**1**	**2**	**0.0**	**0.0**
41. Beloit, Wis.	0	0	0	0.0	0.0
42. Granite City, Ill.	**0**	**1**	**0**	**0.0**	**0.0**
43. Wyoming, Mich.	**0**	**1**	**1**	**0.0**	**0.0**
44. Chicopee, Mass.	**0**	**2**	**0**	**0.0**	**0.0**
45. East Hartford, Conn.	0	0	2	0.0	0.0
46. Wausau, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
47. Galesburg, Ill.	0	0	0	0.0	0.0
48. Torrington, Conn.	0	0	0	0.0	0.0
49. Sandusky, Ohio	0	0	0	0.0	0.0
50. Janesville, Wis.	**0**	**1**	**1**	**0.0**	**0.0**
51. Fairfield, Conn.	**0**	**4**	**2**	**0.0**	**0.0**
52. Mountain View, Calif.	0	0	1	0.0	0.0
53. Jackson, Tenn.	0	0	0	0.0	0.0
54. Manhattan Bch., Calif.	0	0	0	0.0	0.0
55. South Euclid, Ohio	0	0	0	0.0	0.0
56. Findlay, Ohio	0	0	0	0.0	0.0
57. Chillicothe, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
58. Fair Lawn, N. J.	0	0	2	0.0	0.0
59. Baldwin Park, Calif.	0	0	1	0.0	0.0
60. Rock Hills, S. C.	0	0	1	0.0	0.0
61. Fond du Lac, Wis.	0	0	1	0.0	0.0
62. Park Ridge, Ill.	0	0	0	0.0	0.0
63. Columbia, Mo.	**0**	**1**	**0**	**0.0**	**0.0**
64. Mason City, Iowa	0	0	0	0.0	0.0
65. National City, Calif.	0	0	0	0.0	0.0
66. Steubenville, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
67. Oak Park, Mich.	0	0	0	0.0	0.0
68. Allen Park, Mich.	0	0	0	0.0	0.0
69. Fitchburg, Mass.	**0**	**2**	**0**	**0.0**	**0.0**
70. Kearny, N. J.	**0**	**1**	**0**	**0.0**	**0.0**
71. Manitowoc, Wis.	0	0	1	0.0	0.0
72. Lockport, N. Y.	0	0	1	0.0	0.0
73. Petersburg, Va.	0	0	1	0.0	0.0
74. Walla Walla, Wash.	0	0	1	0.0	0.0
75. Birmingham, Mich.	0	0	0	0.0	0.0
76. Florence, S. C.	**0**	**3**	**1**	**0.0**	**0.0**
77. Minot, N. D.	**0**	**1**	**0**	**0.0**	**0.0**
78. Mt. Clemens, Mich.	0	0	0	0.0	0.0
79. Redlands, Calif.	**0**	**1**	**0**	**0.0**	**0.0**
80. Montclair, N. J.	0	0	1	0.0	0.0
81. Provo, Utah	0	0	0	0.0	0.0
82. Norman, Okla.	**0**	**1**	**1**	**0.0**	**0.0**
83. Middletown, Conn.	**0**	**1**	**1**	**0.0**	**0.0**
84. Burlington, Vt.	0	0	0	0.0	0.0
85. New Kensington, Pa.	**0**	**2**	**0**	**0.0**	**0.0**
86. Watertown, Mass.	0	0	0	0.0	0.0
87. Burlington, N. C.	0	0	0	0.0	0.0
88. Amsterdam, N. Y.	0	0	0	0.0	0.0
89. Webster Groves, Mo.	0	0	0	0.0	0.0
90. Grand Forks, N. D.	0	0	0	0.0	0.0
91. Lewiston, Maine	0	0	0	0.0	0.0
92. Shaker Heights, Ohio	0	0	1	0.0	0.0
93. Annapolis, Md.	**0**	**1**	**0**	**0.0**	**0.0**
94. Denton, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
95. Wallingford, Conn.	**0**	**2**	**0**	**0.0**	**0.0**
96. Maple Heights, Ohio	0	0	0	0.0	0.0
97. Winona, Minn.	0	0	0	0.0	0.0
98. Highland Park, Ill.	**0**	**2**	**0**	**0.0**	**0.0**
99. East Lansing, Mich.	0	0	0	0.0	0.0
100. Mt. Lebanon, Pa.	0	0	0	0.0	0.0
101. Park Forest, Ill.	0	0	0	0.0	0.0
102. Belmont, Mass.	0	0	0	0.0	0.0
103. Groton, Conn.	0	0	1	0.0	0.0
104. Lackawanna, N. Y.	0	0	1	0.0	0.0
105. Palo Alto, Calif.	**1**	**3**	**0**	**1.2**	**8.3**
106. Billings, Mont.	1	0	1	1.3	10.4
107. Redwood City, Calif.	1	0	2	1.4	10.3
108. Odessa, Tex.	**1**	**2**	**0**	**1.4**	**9.0**
109. Ontario, Calif.	1	1	0	1.4	9.6
110. Vancouver, Wash.	1	0	0	1.5	9.5
111. Great Falls, Mont.	1	0	1	1.5	8.6
112. Poughkeepsie, N. Y.	1	1	1	1.6	9.8
All cities in this group				1.6	7.5
113. Elgin, Ill.	**1**	**2**	**1**	**1.7**	**8.3**
114. High Point, N. C.	1	0	1	1.9	9.1
115. Warwick, R. I.	**1**	**4**	**3**	**1.9**	**9.3**
116. Owensboro, Ky.	1	0	1	1.9	9.3
117. Rapid City, S. D.	1	1	1	1.9	10.0
118. Moline, Ill.	1	1	2	2.0	10.2
119. Oxnard, Calif.	1	1	1	2.0	11.7
120. Port Huron, Mich.	1	1	1	2.0	10.4
121. West Covina, Calif.	1	0	1	2.0	8.4
122. Aurora, Colo.	1	0	1	2.0	16.0
123. Danbury, Conn.	1	0	1	2.0	9.4
124. Champaign, Ill.	1	0	0	2.1	8.2
125. Newburgh, N. Y.	1	0	0	2.1	12.3
126. Sheboygan, Wis.	1	0	0	2.1	8.4
127. St. Louis Park, Minn.	1	1	0	2.1	10.4
128. Arlington, Mass.	1	1	0	2.3	8.5
129. Elmhurst, Ill.	1	0	1	2.3	11.5
130. Rome, N. Y.	1	0	0	2.3	8.4
131. Bloomington, Ind.	1	0	0	2.3	13.3
132. East Cleveland, Ohio	1	0	0	2.4	9.9
133. Barberton, Ohio	1	0	4	2.4	11.1
134. Linden, N. J.	1	0	3	2.4	10.9
135. Roseville, Mich.	**1**	**2**	**0**	**2.4**	**9.6**
136. Rome, Ga	1	0	1	2.4	12.4
137. Manchester, Conn.	1	0	1	2.4	10.1
138. West Orange, N. J.	1	0	2	2.5	11.7
139. Bloomington, Ill.	1	0	0	2.5	11.0
140. Burlington, Iowa	1	0	1	2.6	13.1
141. Westfield, N. J.	1	0	1	2.6	15.4
142. Monroe, Mich.	1	0	0	2.7	14.3
143. Bangor, Maine	1	0	0	2.8	10.0
144. Hackensack, N. J.	1	1	1	2.8	12.5
145. Richfield, Minn.	1	0	1	2.8	11.3
146. Teaneck, N. J.	1	1	2	2.8	10.5
147. Vallejo, Calif.	2	2	1	2.9	18.2
148. Watertown, N. Y.	1	0	1	2.9	11.2
149. Greenville, Miss.	1	0	0	2.9	11.6
150. Tallahassee, Fla.	2	0	0	2.9	21.0
151. Bristol, Conn.	1	0	0	2.9	8.8
152. Iowa City, Iowa	1	0	0	3.0	14.7
153. Rahway, N. J.	1	0	1	3.0	14.9
154. Garfield Hghts., Ohio	1	1	0	3.1	11.4
155. Boise, Idaho	2	0	0	3.2	23.3
156. Parkersburg, W. Va.	1	0	0	3.2	12.8
157. Concord, N. H.	1	0	0	3.2	13.4
158. Hamden, Conn.	1	0	0	3.4	10.5
159. Fairmont, W. Va.	1	0	0	3.4	13.7
160. Urbana, Ill.	1	0	0	3.6	15.3
161. Santa Clara, Calif.	2	2	1	3.7	18.5
162. Spartanburg, S. C.	**2**	**3**	**1**	**3.8**	**19.2**
163. Hazel Park, Mich.	1	0	1	3.8	15.0
164. Daytona Beach, Fla.	2	1	2	3.8	22.1
165. Hagerstown, Md.	2	2	1	3.9	20.8
166. Enid, Okla.	2	1	0	4.0	21.5
167. Muskogee, Okla.	2	0	0	4.2	21.4
168. Bellingham, Wash.	2	0	1	4.3	21.9
169. Danville, Va.	2	0	0	4.3	16.1
170. Fremont, Calif.	**1**	**3**	**2**	**4.4**	**14.9**
171. East Detroit, Mich.	2	0	0	4.5	18.6
172. Vineland, N. J.	**2**	**3**	**2**	**4.6**	**24.2**
173. Des Plaines, Ill.	2	0	1	4.7	26.1
174. West Haven, Conn.	2	0	0	4.8	21.5
175. Norwich, Conn.	2	0	0	5.0	20.5
176. Kankakee, Ill.	2	1	0	5.1	28.2
177. Milford, Conn.	2	0	0	5.3	20.4
178. Hamtramck, Mich.	2	0	1	5.7	17.4
179. St. Cloud, Minn.	2	0	0	5.7	24.8
180. Kettering, Ohio	2	0	0	6.1	16.5
181. New London, Conn.	2	0	0	6.1	25.6
182. Wauwatosa, Wis.	3	0	0	6.2	25.9
183. Sumter, S. C.	2	0	1	6.2	31.7
184. Temple, Tex.	2	1	0	6.2	26.6
185. Freeport, Ill.	2	0	0	6.4	31.3
186. Michigan City, Ind.	3	0	1	7.3	36.3
187. Revere, Mass.	2	1	2	7.3	20.2
188. Southfield, Mich.	2	0	0	7.5	30.0
189. Livonia, Mich.	5	0	1	8.3	40.9
190. Superior, Wis.	3	2	0	10.2	34.0
191. Mishawaka, Ind.	5	0	0	12.0	58.7

Group IX (10,000 to 25,000)

1. Boulder, Colo.	0	0	0	0.0	0.0
2. Mesa, Ariz.	**0**	**2**	**0**	**0.0**	**0.0**
3. Santa Cruz, Calif.	0	0	1	0.0	0.0
4. La Mesa, Calif.	0	0	0	0.0	0.0
5. Salinas, Calif.	0	0	1	0.0	0.0
6. Ft. Pierce, Fla.	**0**	**4**	**1**	**0.0**	**0.0**
7. Medford, Ore.	**0**	**1**	**0**	**0.0**	**0.0**
8. Grand Island, Neb.	0	0	1	0.0	0.0
9. Austin, Minn.	0	0	0	0.0	0.0
10. Garland, Tex.	0	0	1	0.0	0.0
11. Orange, Calif.	0	0	2	0.0	0.0
12. Merced, Calif.	**0**	**2**	**1**	**0.0**	**0.0**
13. Los Altos, Calif.	**0**	**2**	**0**	**0.0**	**0.0**
14. Edina, Minn.	0	0	0	0.0	0.0
15. Lawrence, Kan.	0	0	0	0.0	0.0
16. Longview, Wash.	0	0	2	0.0	0.0
17. Lodi, Calif.	0	0	1	0.0	0.0
18. Waukesha, Wis.	**0**	**2**	**0**	**0.0**	**0.0**
19. Port Chester, N. Y.	0	0	0	0.0	0.0
20. Big Spring, Tex.	**0**	**2**	**2**	**0.0**	**0.0**
21. La Porte, Ind.	0	0	3	0.0	0.0
22. Bartlesville, Okla.	0	0	0	0.0	0.0
23. Bismarck, N. D.	0	0	0	0.0	0.0
24. Carlsbad, N. M.	0	0	0	0.0	0.0
25. Klamath Falls, Ore.	0	0	0	0.0	0.0
26. Lake Worth, Fla.	0	0	0	0.0	0.0
27. Sherman, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
28. Butler, Pa.	0	0	0	0.0	0.0
29. Endicott, N. Y.	0	0	1	0.0	0.0
30. Ypsilanti, Mich.	0	0	1	0.0	0.0
31. Ames, Iowa	0	0	1	0.0	0.0
32. Frederick, Md.	0	0	0	0.0	0.0
33. El Cerrito, Calif.	0	0	1	0.0	0.0
34. Ocala, Fla.	0	0	0	0.0	0.0
35. Napa, Calif.	0	0	0	0.0	0.0
36. San Fernando, Calif.	0	0	0	0.0	0.0
37. North Miami, Fla.	**0**	**1**	**0**	**0.0**	**0.0**
38. Covina, Calif.	0	0	1	0.0	0.0
39. Great Bend, Kan.	0	0	0	0.0	0.0
40. East Haven, Conn.	0	0	0	0.0	0.0
41. Lombard, Ill.	0	0	0	0.0	0.0
42. Lufkin, Tex.	0	0	2	0.0	0.0
43. Corvallis, Ore.	0	0	0	0.0	0.0
44. Manhattan, Kan.	0	0	0	0.0	0.0
45. Tiffin, Ohio	0	0	0	0.0	0.0
46. Uniontown, Pa.	0	0	0	0.0	0.0
47. Wilmette, Ill.	0	0	0	0.0	0.0
48. Jeffersonville, Ind.	0	0	0	0.0	0.0
49. North Platte, Neb.	0	0	0	0.0	0.0
50. Madison Hgts., Mich.	**0**	**1**	**0**	**0.0**	**0.0**
51. Fremont, Ohio	0	0	0	0.0	0.0
52. Aberdeen, S. D.	**0**	**1**	**1**	**0.0**	**0.0**
53. Denison, Tex.	**0**	**1**	**1**	**0.0**	**0.0**
54. Cranford, N. J.	0	0	0	0.0	0.0
55. Plainview, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
56. Robbinsdale, Minn.	0	0	2	0.0	0.0
57. Salisbury, N. C.	0	0	1	0.0	0.0
58. Brownwood, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
59. Pittsburg, Kan.	0	0	0	0.0	0.0
60. Muscatine, Iowa	0	0	0	0.0	0.0
61. Westport, Conn.	0	0	0	0.0	0.0
62. Glendora, Calif.	**0**	**2**	**0**	**0.0**	**0.0**
63. Muskegon Hts., Mich.	0	0	0	0.0	0.0
64. Floral Park, N. Y.	0	0	0	0.0	0.0
65. Ada, Okla.	0	0	0	0.0	0.0
66. South St. Paul, Minn.	0	0	0	0.0	0.0
67. Texarkana, Ark.	**0**	**1**	**0**	**0.0**	**0.0**
68. Hibbing, Minn.	0	0	0	0.0	0.0
69. Cape Girardeau, Mo.	0	0	0	0.0	0.0
70. So. Portland, Maine	0	0	0	0.0	0.0
71. Oceanside, Calif.	**0**	**1**	**1**	**0.0**	**0.0**
72. Richland, Wash.	0	0	0	0.0	0.0
73. Emporia, Kan.	0	0	0	0.0	0.0
74. Meadville, Pa.	0	0	0	0.0	0.0
75. Niles, Mich.	0	0	0	0.0	0.0
76. Marietta, Ohio	0	0	0	0.0	0.0
77. Albert Lea, Minn.	**0**	**1**	**0**	**0.0**	**0.0**
78. Calumet City, Ill.	**0**	**2**	**1**	**0.0**	**0.0**
79. Wooster, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
80. Augusta, Maine	0	0	3	0.0	0.0
81. Hillside, N. J.	0	0	0	0.0	0.0
82. Johnson City, N. Y.	0	0	0	0.0	0.0
83. Berkley, Mich.	**0**	**1**	**0**	**0.0**	**0.0**
84. Moorhead, Minn.	**0**	**1**	**1**	**0.0**	**0.0**
85. Chico, Calif.	0	0	1	0.0	0.0
86. Xenia, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
87. Streator, Ill.	0	0	0	0.0	0.0
88. Connersville, Ind.	**0**	**1**	**0**	**0.0**	**0.0**
89. Huntington, Ind.	0	0	0	0.0	0.0
90. Snyder, Tex.	0	0	0	0.0	0.0
91. Stillwater, Okla.	0	0	1	0.0	0.0
92. Martinsville, Va.	**0**	**3**	**0**	**0.0**	**0.0**
93. Elmwood Park, Ill.	0	0	0	0.0	0.0
94. Oswego, N. Y.	0	0	0	0.0	0.0
95. Shorewood, Wis.	0	0	0	0.0	0.0
96. Pittsburg, Calif.	0	0	0	0.0	0.0
97. Ashland, Ohio	0	0	0	0.0	0.0
98. Greensburg, Pa.	0	0	0	0.0	0.0

	Three Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
99. Kennewick, Wash.	**0**	**4**	**0**	**0.0**	**0.0**
100. New Bern, N. C.	0	0	1	0.0	0.0
101. Mt. Vernon, Ill.	0	0	0	0.0	0.0
102. So. Milwaukee, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
103. Statesville, N. C.	0	0	0	0.0	0.0
104. Tempe, Ariz.	**0**	**2**	**0**	**0.0**	**0.0**
105. Valparaiso, Ind.	0	0	0	0.0	0.0
106. El Dorado, Kan.	0	0	0	0.0	0.0
107. Peru, Ind.	0	0	0	0.0	0.0
108. Brainerd, Minn.	**0**	**1**	**0**	**0.0**	**0.0**
109. Woodland, Calif.	0	0	0	0.0	0.0
110. Arkansas City, Kan.	**0**	**1**	**0**	**0.0**	**0.0**
111. Pendleton, Ore.	0	0	0	0.0	0.0
112. Escondido, Calif.	**0**	**1**	**0**	**0.0**	**0.0**
113. Sterling, Ill.	0	0	0	0.0	0.0
114. Evergreen Park, Ill.	0	0	0	0.0	0.0
115. Marquette, Mich.	0	0	0	0.0	0.0
116. Pasco, Wash.	**0**	**1**	**0**	**0.0**	**0.0**
117. Fostoria, Ohio	0	0	0	0.0	0.0
118. Stevens Point, Wis.	0	0	0	0.0	0.0
119. La Grange, Ill.	0	0	0	0.0	0.0
120. Takoma Park, Md.	0	0	0	0.0	0.0
121. Niles, Ohio	0	0	0	0.0	0.0
122. Defiance, Ohio	0	0	0	0.0	0.0
123. McAlester, Okla.	**0**	**1**	**0**	**0.0**	**0.0**
124. Alpena, Mich.	**0**	**2**	**0**	**0.0**	**0.0**
125. De Kalb, Ill.	0	0	0	0.0	0.0
126. Massena, N. Y.	0	0	0	0.0	0.0
127. East Moline, Ill.	0	0	0	0.0	0.0
128. Brookfield, Ill.	0	0	0	0.0	0.0
129. Goshen, Ind.	**0**	**1**	**0**	**0.0**	**0.0**
130. Bristol, Va.	0	0	0	0.0	0.0
131. Naugatuck, Conn.	**0**	**2**	**0**	**0.0**	**0.0**
132. Tracey, Calif.	0	0	0	0.0	0.0
133. Attleboro, Mass.	**0**	**2**	**0**	**0.0**	**0.0**
134. Owatonna, Minn.	0	0	0	0.0	0.0
135. Highland Park, Tex.	0	0	1	0.0	0.0
136. Norfolk, Neb.	0	0	0	0.0	0.0
137. Wethersfield, Conn.	0	0	0	0.0	0.0
138. Prescott, Ariz.	0	0	0	0.0	0.0
139. Wisconsin Rpds., Wis.	0	0	0	0.0	0.0
140. Faribault, Minn.	0	0	0	0.0	0.0
141. Rocky River, Ohio	0	0	0	0.0	0.0
142. Glenview, Ill.	0	0	1	0.0	0.0
143. Needham, Mass.	**0**	**1**	**0**	**0.0**	**0.0**
144. The Dalles, Ore.	0	0	0	0.0	0.0
145. Port Angeles, Wash.	0	0	0	0.0	0.0
146. Garden City, Kan.	0	0	0	0.0	0.0
147. Shelton, Conn.	0	0	4	0.0	0.0
148. Vernon, Conn.	0	0	0	0.0	0.0
149. Hanford, Calif.	0	0	0	0.0	0.0
150. Boone, Iowa	0	0	0	0.0	0.0
151. Sault Ste. Marie, Mich.	0	0	0	0.0	0.0
152. Fergus Falls, Minn.	0	0	0	0.0	0.0
153. North Adams, Mass.	**0**	**1**	**0**	**0.0**	**0.0**
154. South Orange, N. J.	**0**	**1**	**1**	**0.0**	**0.0**
155. Logan, Utah	0	0	0	0.0	0.0
156. Astoria, Ore.	0	0	0	0.0	0.0
157. Winfield, Kan.	0	0	0	0.0	0.0
158. Branford, Conn.	0	0	0	0.0	0.0
159. Hinsdale, Ill.	0	0	0	0.0	0.0
160. Kenmore, N. Y.	0	0	0	0.0	0.0
161. State College, Pa.	0	0	0	0.0	0.0
162. Mamaroneck, N. Y.	**0**	**1**	**0**	**0.0**	**0.0**
163. Waynesboro, Va.	0	0	0	0.0	0.0
164. Hawthorne, N. J.	0	0	0	0.0	0.0
165. Moses Lake, Wash.	0	0	1	0.0	0.0
166. Marshfield, Wis.	0	0	0	0.0	0.0
167. Albany, Calif.	0	0	1	0.0	0.0
168. Coronado, Calif.	**0**	**1**	**1**	**0.0**	**0.0**
169. St. Joseph, Mich.	0	0	0	0.0	0.0
170. Lamesa, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
171. Escanaba, Mich.	0	0	0	0.0	0.0
172. Jennings, Mo.	0	0	0	0.0	0.0
173. Enfield, Conn.	0	0	0	0.0	0.0
174. Brawley, Calif.	0	0	2	0.0	0.0
175. Gardner, Mass	0	0	1	0.0	0.0
176. Canton, Ill.	**0**	**1**	**0**	**0.0**	**0.0**
177. Martinsburg, W. Va.	0	0	0	0.0	0.0
178. Mitchell, S. D.	0	0	0	0.0	0.0
179. Beaver Dam, Wis.	0	0	0	0.0	0.0
180. Hopewell, Va.	0	0	0	0.0	0.0
181. Conneaut, Ohio	0	0	0	0.0	0.0
182. Galion, Ohio	0	0	0	0.0	0.0
183. Winnetka, Ill.	0	0	0	0.0	0.0
184. Menasha, Wis.	0	0	0	0.0	0.0
185. N. College Hill, Ohio	0	0	0	0.0	0.0
186. North Olmsted, Ohio	0	0	1	0.0	0.0
187. Mt. Pleasant, Mich.	0	0	1	0.0	0.0
188. Seaside, Calif.	0	0	0	0.0	0.0
189. Albion, Mich.	0	0	0	0.0	0.0
190. Van Wert, Ohio	0	0	0	0.0	0.0
191. Bellefontaine, Ohio	0	0	0	0.0	0.0
192. Bowling Green, Ohio	0	0	0	0.0	0.0
193. Northbrook, Ill.	0	0	0	0.0	0.0
194. Central Falls, R. I.	0	0	0	0.0	0.0
195. Suffolk, Va.	0	0	0	0.0	0.0
196. Windsor, Conn.	**0**	**1**	**0**	**0.0**	**0.0**
197. Hornell, N. Y.	0	0	0	0.0	0.0
198. Virginia, Minn.	0	0	0	0.0	0.0
199. Grosse Pt. Wds., Mich.	0	0	0	0.0	0.0
200. Du Bois, Pa.	**0**	**1**	**0**	**0.0**	**0.0**
201. Marinette, Wis.	**0**	**1**	**1**	**0.0**	**0.0**
202. Winchester, Conn.	**0**	**1**	**0**	**0.0**	**0.0**
203. Red Wing, Minn.	0	0	0	0.0	0.0
204. River Forest, Ill.	0	0	0	0.0	0.0
205. Circleville, Ohio	0	0	0	0.0	0.0
206. Cudahy, Wis.	0	0	0	0.0	0.0
207. Homewood, Ala.	**0**	**1**	**0**	**0.0**	**0.0**
208. Pacific Grove, Calif.	0	0	0	0.0	0.0
209. Cadillac, Mich.	0	0	0	0.0	0.0
210. University Hts., Ohio	0	0	0	0.0	0.0
211. Charles City, Iowa	0	0	0	0.0	0.0
212. Rock Springs, Wyo.	0	0	0	0.0	0.0
213. Cambridge, Md.	0	0	0	0.0	0.0
214. La Grange Park, Ill.	0	0	0	0.0	0.0
215. Fairfield, Calif.	0	0	0	0.0	0.0

TRAFFIC DEATHS—STATE RECORDS

Deaths are reported by state traffic authorities.

All figures are preliminary. To insure proper comparisons, 1959 and 1958 figures cover the same reporting period as those for 1960.

Population Rate: U. S. population rate is the estimated annual number of deaths per 100,000 population, assuming that deaths for the rest of the year will follow the normal seasonal pattern. State population rate is the estimated annual number of deaths per 100,000 population, assuming that the monthly average of deaths will remain at the present average for the rest of the year. Population rates are based on July 1, 1959, population estimates, U. S. Bureau of the Census, Washington, D. C.

States shown in heavy type have improved in 1960 compared with 1959, or showed no change.

Mileage rate: The number of deaths per 100 million vehicle miles of travel.

(Figures in parenthesis following the 1960 mileage rate indicate the number of months for which the mileage rate is calculated for each state.)

	Months Reported	Deaths Identical Periods 1960	1959	1958	% Change 1959 to 1960	1958 to 1960	1960 Pop. Rate	1960 Mile. Rate	
TOTAL U.S.	3	7,680	8,080	7,705	— 5%	0%	20.0	5.0	(2)
Ala.	3	162	182	179	— 11%	— 9%	20.3	5.0	(1)
Alaska	3	3	4	4	— 25%	— 25%	6.3	—	—
Ariz.	3	112	132	122	— 15%	— 8%	36.3	6.6	(2)
Ark.	3	77	79	83	— 3%	— 7%	17.6	5.5	(2)
Calif.	3	799	837	741	— 5%	+ 8%	21.8	5.3	(1)
Colo.	3	73	67	65	+ 9%	+ 12%	17.4	5.7	(1)
Conn.	3	53	53	43	0%	+ 23%	8.8	2.2	(2)
Del.	3	18	15	13	+ 20%	+ 38%	15.9	4.2	(2)
D. of C.	3	19	16	10	+ 19%	+ 90%	9.0	—	—
Fla.	3	334	304	289	+ 10%	+ 16%	28.1	6.9	(1)
Ga.	3	230	225	208	+ 2%	+ 11%	24.0	6.2	(2)
Hawaii	2	14	17	—	— 18%	—	12.8	—	—
Idaho	3	35	53	46	— 34%	— 24%	21.1	3.4	(1)
Ill.	3	322	346	381	— 7%	— 15%	12.6	5.0	(1)
Ind.	3	226	220	204	+ 3%	+ 11%	19.5	4.9	(2)
Ia.	3	103	149	140	— 31%	— 26%	14.7	—	—
Kan.	3	87	115	91	— 24%	— 4%	16.3	4.3	(1)
Ky.	3	147	164	179	— 10%	— 18%	18.8	7.5	(1)
La.	3	183	159	221	+ 15%	— 17%	23.1	7.1	(2)
Me.	3	25	29	23	— 14%	+ 9%	10.5	3.5	(2)
Md.	3	117	122	115	— 4%	+ 2%	15.4	5.5	(1)
Mass.	3	106	113	118	— 6%	— 10%	8.6	2.9	(2)
Mich.	3	286	213	263	+ 34%	+ 9%	14.4	5.6	(1)
Minn.	3	119	124	120	— 4%	— 1%	14.0	—	—
Miss.	3	150	131	89	+ 15%	+ 69%	27.5	8.0	(2)
Mo.	3	218	182	169	+ 20%	+ 29%	20.6	6.5	(1)
Mont.	3	31	33	39	— 6%	— 21%	18.0	5.6	(2)
Neb.	3	44	59	60	— 25%	— 27%	12.1	5.6	(1)
Nev.	3	24	30	10	— 20%	+ 26%	34.3	5.7	(1)
N. H.	3	10	24	5	— 58%	+100%	6.8	2.4	(2)
N. J.	3	154	165	159	— 7%	— 3%	10.4	3.3	(2)
N. M.	3	93	98	78	— 5%	+ 19%	42.3	8.6	(1)
N. Y.	3	385	438	443	— 12%	— 13%	9.3	4.1	(1)
N. C.	3	228	273	198	— 16%	+ 15%	20.1	6.3	(1)
N. D.	3	20	25	25	— 20%	— 20%	12.3	—	—
Ohio	3	361	327	404	+ 10%	— 11%	14.9	—	—
Okla.	3	111	140	142	— 21%	— 22%	19.5	3.8	(1)
Ore.	3	75	97	81	— 23%	— 7%	17.0	4.4	(2)
Pa.	3	314	395	340	— 21%	— 8%	11.2	4.3	(1)
R. I.	3	13	19	11	— 32%	+ 18%	5.9	1.5	(2)
S. C.	3	163	122	135	+ 34%	+ 21%	27.0	8.7	(2)
S. D.	3	34	42	54	— 19%	— 37%	19.8	4.5	(2)
Tenn.	3	156	143	151	+ 9%	+ 3%	17.8	—	—
Texas	3	441	551	485	— 20%	— 9%	18.5	3.7	(1)
Utah	3	42	30	28	+ 40%	+ 50%	19.1	6.4	(1)
Vt.	3	16	21	8	— 24%	+100%	17.2	7.1	(1)
Va.	3	147	179	179	— 18%	— 18%	14.7	4.1	(2)
Wash.	3	120	112	116	+ 7%	+ 3%	17.0	5.1	(1)
W. Va.	3	60	87	70	— 31%	— 14%	12.2	8.8	(1)
Wis.	3	154	141	151	+ 9%	+ 2%	15.4	5.0	(1)
Wyo.	3	16	27	26	— 41%	— 38%	20.1	4.2	(2)
P. R.‡	3	82	63	71	+ 30%	+ 15%	14.1	—	—
V. I.†	3	3	2	1	+ 50%	+200%	44.4	—	—
CANADIAN PROVINCES									
Alta.	1	15	7	17	+114%	— 12%	15.5	—	—
B. C.	1	22	14	21	+ 57%	+ 5%	17.8	—	—
Man.	2	8	13	9	— 38%	— 11%	5.6	—	—
Sask.	2	13	3	13	+333%	0%	8.9	—	—

‡Commonwealth of Puerto Rico
†Virgin Islands

	Three Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
216. Menominee, Mich.	0	0	1	0.0	0.0
217. Bemidji, Minn.	**0**	**1**	**0**	**0.0**	**0.0**
218. Grosse Pte. Pk., Mich.	0	0	0	0.0	0.0
219. Two Rivers, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
220. Henderson, N. C.	0	0	1	0.0	0.0
221. Covington, Va.	0	0	0	0.0	0.0
222. Huntington Bch., Calif.	**0**	**7**	**1**	**0.0**	**0.0**
223. Dyersburg, Tenn.	**0**	**2**	**0**	**0.0**	**0.0**
224. Ecorse, Mich.	0	0	0	0.0	0.0
225. Maumee, Ohio	0	0	0	0.0	0.0
226. Fort Thomas, Ky.	0	0	0	0.0	0.0
227. Stoughton, Mass.	0	0	0	0.0	0.0
228. Los Alamos, N. M.	**0**	**1**	**0**	**0.0**	**0.0**
229. Moscow, Idaho	0	0	0	0.0	0.0
230. Monroe, N. C.	0	0	1	0.0	0.0
231. Mansfield, Conn.	0	0	0	0.0	0.0
232. Bellaire, Ohio	0	0	0	0.0	0.0
233. Stonington, Conn.	**0**	**1**	**0**	**0.0**	**0.0**
234. Ridgefield Park, N. J.	0	0	0	0.0	0.0
235. Webster, Mass.	0	0	0	0.0	0.0
236. Ashland, Wis.	0	0	0	0.0	0.0
237. Fairfield, Ala.	0	0	0	0.0	0.0
238. Watertown, Conn.	**0**	**1**	**0**	**0.0**	**0.0**
239. Killingly, Conn.	**0**	**1**	**0**	**0.0**	**0.0**
240. Amherst, Mass.	0	0	0	0.0	0.0
241. Mercedes, Tex.	0	0	0	0.0	0.0
242. Donora, Pa.	0	0	0	0.0	0.0
All cities in this group				1.0	5.4
243. Fort Myers, Fla.	1	0	0	2.7	22.6
244. Ponca City, Okla.	1	0	0	2.8	17.3
245. Tampa, Tex.	1	0	0	3.3	20.9
246. Kinston, N. C.	1	0	0	3.6	17.7
247. W. Springfield, Mass.	1	1	3	3.6	17.5
248. Wheaton, Ill.	1	0	0	3.6	16.9
249. Renton, Wash.	1	0	1	3.7	23.7
250. Monterey, Calif.	1	0	1	3.8	18.3
251. Owosso, Mich.	1	0	0	3.8	20.1
252. Sedalia, Mo.	1	0	0	3.8	18.9
253. Morristown, N. J.	1	0	0	3.8	22.6
254. Holland, Mich.	1	0	0	3.9	20.5
255. Yuma, Ariz.	1	0	0	4.0	31.5
256. Colton, Calif.	1	0	0	4.0	21.2
257. Cedar Falls, Iowa	1	0	0	4.1	22.3
258. Hollywood, Fla.	2	1	1	4.2	35.1
259. Greenville, Tex.	1	1	0	4.3	25.8
260. Caldwell, Idaho	**1**	**2**	**0**	**4.6**	**34.2**
261. Newton, Kan.	1	0	0	4.7	30.3
262. Greenwood, Miss.	1	1	0	4.8	20.7
263. Antioch, Calif.	1	0	1	4.8	25.8
264. Collingswood, N. J.	1	1	0	4.8	22.2
265. Darien, Conn.	1	1	0	5.1	25.5
266. Livermore, Calif.	1	0	0	5.1	31.7
267. Santa Paula, Calif.	1	0	0	5.1	32.8
268. Watertown, Wis.	1	0	0	5.5	30.8
269. Victoria, Tex.	2	0	0	5.6	35.7
270. Rye, N. Y.	1	0	0	5.6	28.8
271. Griffin, Ga.	1	0	0	5.6	28.6
272. Ansonia, Conn.	1	0	0	5.7	20.3
273. Lexington, N. C.	1	0	1	5.7	27.8
274. Atchison, Kan.	1	0	1	5.9	31.3
275. Plymouth, Mich.	1	0	0	6.2	36.7
276. Southington, Conn.	1	0	1	6.5	23.7
277. Dover, Ohio	1	0	1	6.7	37.0
278. River Rouge, Mich.	1	1	0	7.0	18.8
279. Windham, Conn.	1	0	0	7.3	21.9
280. North Chicago, Ill.	1	0	1	7.5	22.2
281. Milford, Mass.	1	1	0	7.7	25.6
282. Westlake, Ohio	1	1	0	7.7	37.4
283. West Lafayette, Ind.	**1**	**3**	**0**	**7.8**	**30.5**
284. Auburn, Mass.	1	0	0	7.9	32.3
285. La Salle, Ill.	1	0	0	8.3	33.1
286. Beacon, N. Y.	1	0	1	8.6	26.7
287. Leominster, Mass.	2	0	1	8.7	32.3
288. Bell, Calif.	3	0	0	9.6	65.2
289. Corona, Calif.	2	2	0	9.6	63.0
290. Pompano Bch., Calif.	2	0	0	10.3	66.7
291. Derby, Conn.	2	0	0	16.6	72.1
292. Bloomington, Minn.	5	0	0	21.8	158.7
293. Reidsville, N. C.	4	0	0	27.9	136.8
CANADIAN CITIES					
London, Ont.	0	1	2	—	0.0
Montreal, Que.	17	19	21	—	6.1
Toronto, Ont.	27	20	45	—	7.3
Hamilton, Ont.	7	6	4	—	11.5

Carol Lane Award

Nominations

Close June 15

MOTOR VEHICLE DEATHS AND INJURIES BY STATES 1960 and 1959

Twenty-six states and the District of Columbia have reported their death and injury experience for one to two months of 1960.

The table below shows all of the injury data reported by each state, but little information is available on precisely what injuries are included in each state's tabulation.

Differences in the ratio of injuries to deaths probably reflect primarily differences in the extent to which all injuries are reported. Other factors are undoubtedly involved, such as: (1) a few states omit some or all of the injuries in urban accidents; (2) there are large differences between states in the proportion of travel which is in urban area (the injury-death ratio for urban accidents is about four times the ratio for rural accidents).

The question of what injuries are being reported applies with equal force to the per cent change in injuries from 1959 to 1960. Any tightening up of police administration, any emphasis on "get all the injuries" is almost certain to bring about an increase in reported injuries, but probably only in minor ones. Similarly, instructions to "skip the scratches" probably would result in a decrease in recorded cases in many states. Introduction of financial responsibility laws has been observed to increase reported injuries sharply. Even the public's increased claims-consciousness is regarded by many people as an element in the growing number of injuries reported. With such factors operating to destroy comparability, indicated changes in the number of injuries should not be considered as reliable.

	Months Reported	Deaths†† 1960	Deaths†† 1959	Injuries†† 1960	Injuries†† 1959	% Change 1959 to 1960 Deaths	% Change 1959 to 1960 Injuries	1960 Ratio of Injuries to Deaths
TOTAL U.S.	**	2,876#	2,708#	111,546	105,653	+ 6#	+ 6	39
Ala.	2	91	116	676†	702†	— 22	— 4	7
Ariz.								
Ark.	2	57	50	460	349	+ 14	+ 32	8
Calif.	1	282	280	11,582	11,113	+ 1	+ 4	41
Colo.								
Conn.								
Del.	2	13	9	378	325	+ 44	+ 16	29
D. of C.	2	17	10	1,135	1,022	+ 70	+ 11	67
Fla.	2	205	207	8,148	7,365	— 1	+ 11	40
Ga.	2	155	135	2,653	2,602	+ 15	+ 2	17
Idaho								
Ill.	1	142	95	7,587	7,877	+ 49	— 4	53
Ind.								
Iowa								
Kan.								
Ky.	2	114	95	2,140	2,136	+ 20	+ *	19
La.	2	117	105	1,223†	1,308†	+ 11	— 6	10
Maine	2	20	25	981	899	— 20	+ 9	49
Md.	2	90	77	3,319	2,813	+ 17	+ 18	37
Mass.								
Mich.	2	193	130	12,445	7,908	+ 48	+ 57	64
Minn.	2	89	94	3,508***	4,192***	— 5	— 16	39
Miss.	2	95	83	1,145	1,063	+ 14	+ 8	12
Mo.	2	163	114	1,800	1,399	+ 43	+ 29	11
Mont.								
Neb.								
Nev.								
N. H.	2	8	13	1,002	971	— 38	+ 10	125
N. J.								
N. M.								
N. Y.	1	147	143	19,896	19,990	+ 3	— *	135
N. C.	1	80	115	1,971	1,818	— 30	+ 8	25
N. D.								
Ohio	2	249	203	11,729	10,564	+ 23	+ 11	47
Okla.	1	41	41	1,309	1,190	0	+ 10	32
Ore.	2	52	60	2,413	2,583	— 13	— 7	46
Pa.								
R. I.								
S. C.	2	119	84	1,763	1,417	+ 42	+ 24	15
S. D.								
Tenn.								
Tex.	2	276	366	9,306	11,153	— 25	— 17	34
Utah								
Vt.	2	11	14	422	486	— 21	— 13	38
Va.								
Wash.	1	41	34	2,387	2,243	+ 21	+ 6	58
W. Va.								
Wis.								
Wyo.	1	9	10	168	165	— 10	+ 2	19
P. R.‡	1	20	13	1,123	901	+ 54	+ 25	56
V. I.¶	2	1	0	28	36	+.....	— 22	28

†Rural injuries only.

††All figures are preliminary. To insure proper comparisons, 1959 figures cover the same reporting period as those for 1960.

*Less than .5%.

**Death and injury totals cover reports for all months indicated in this column.

#Death totals and changes differ from national figures because those shown here are based on the states and months for which injury data are reported.

‡Commonwealth of Puerto Rico.

¶Virgin Islands.

***Injury figures not completely comparable due to change in reporting dates.

Safety Library

From Page 6

Safety Rules for the Maintenance Man. *Commercial Car Journal*. March, 1960. p. C6.

Drivers and Driving

Accident-Prone Drivers. *International Road Safety and Traffic Review*. Winter, 1960. p. 31-33.

(A summary of a study conducted by the Psychological Department of the Netherlands Post, Telephone and Telegraph Service.)

Basic Factors of Safe Automobile Driving. A. R. Lauer. *Police*. March-April, 1960. p. 60-61.

(Deals with the basic components of drivers' behavior and their relationship to traffic safety and reduction of traffic accidents.)

A Cross Section of Opinion Regarding Minimum Age Limit of Licensed Drivers. *Pacific Northwest Law Enforcement News*. January-February, 1960. p. 55-56.

(Considered raising age to 18 years.)

Eye Tests for Road Safety: A Report From Kansas City. *Journal of the American Optometric Association*. February, 1960. p. 546-548.

(Drive-O-Rater a mobile test laboratory used for checking eyes.)

International Driving Manual. Prepared at the request of the Economic Commission for Europe. 1960. 21pp. World Touring and Automobile Organization, 32 Chesham Place, London, S.W. 1, England.

(Main purpose of the manual is to extend knowledge of certain basic principles which apply to the driving of a motor vehicle, not only in the interests of improving the behavior of drivers but also in order to encourage greater uniformity of behavior.)

Psychological Factors in Traffic Accidents on Freeways. Theodore W. Forbes. *M.S.U. Center Letter*. February, 1960. p. 3-4.

Grade Crossings

Traffic Accidents at Railroad Crossings Cause Concern Among Safety Authorities. *Wisconsin Traffic Safety Reporter*. March, 1960. p. 1-3.

(State will determine if warning devices are adequate. If not, will order railroads to install suitable safety equipment and the state will pay 50 per cent of the cost.)

Highways

Freeway Benefits. *California Highways and Public Works*. January-February, 1960. p. 60-62.

(Madera Freeway reduces accidents and congestion.)

Heating Methods for Safer Roads in Icy Weather. *The Surveyor*. Sept. 26, 1959. p. 781.

(Report on Road Research Laboratory in England, trials with automatic control system.)

How Safe Are Freeways? *American Motorist*. March, 1960. p. 7-8.

(Freeways have proved that they are a sound investment safety-wise.)

The Millennium for Motorists. Al Toffler. *Coronet*. April, 1960. p. 44-49.

(A prediction for turnpike driving — robot steering and radar navigation.

Roadside Design for Safety. K. A. Stonex. 1960. 37pp. Highway Research Board, 2101 Constitution Ave., N.W., Washington 25, D.C.

(Paper presented at the 39th Annual Meeting of the Highway Research Board, Washington, D. C.)

Safe Roads That Last. Robert N. Williams. *Modern Plastics*. February, 1960. p. 102-103.

(Use of epoxies in road surfaces to waterproof and make skid resistant.)

Traffic Control Through "Logic Circuits" Studied. *Roads and Streets*. March, 1960. p. 62.

(A project currently under development by Ohio State for the creation of "automatic highways.")

Lighting

New Developments in the Field of Roadway Lighting. Charles H. Rex. *Traffic Engineering*. March, 1960. p. 15-25, 28.

(Progress has been made but much must be accomplished to improve night motor vehicle transportation.)

New Lighting Regulations. *Commercial Car Journal*. March, 1960. p. 105-107, 112, 170, 172, 174, 178.

(Announcement of the ICC regulations for vehicles.)

Pedestrians

Pedestrian Segregation. *International Road Safety and Traffic Review*. Winter, 1960. p. 7-8, 10-12, 14.

(The New Town Formula used in England and Europe is similar to the pedestrian mall in the U.S.)

Programs

Pennsylvania Launches 13-Point Safety Program. Joseph Andrews. *AMVA Bulletin*. February, 1960. p. 1-3.

(Will include periodic physical reexamination.)

Traffic Safety in Chicago. Charles S. Michalski. *Traffic Engineering*. February, 1960. p. 17-19, 54.

(Gives briefly the action taken by city authorities and civic groups to reverse Chicago traffic accident trends.)

Signs and Signals

The Safety and Economy of One-Waying. *The American City*. March, 1960. p. 135.

(The traffic control plan for Manhattan, N. Y.)

Speed

Showdown on Speed. *Journal of American Insurance*. March, 1960. p. 1-4.

(Top authorities, in this Journal exclusive, debate the pros and cons in our speed-slaughter complex.)

YOU CAN NOW RENT A Speed-Watch

Hurry! Supply Limited

● Our famous Electric Speed Timer is now available for rental. Try it out. See how effectively and accurately YOU can operate a Speed-Watch. The supply is definitely limited so . . .

WRITE TODAY

TRAFFIC HOUSE, INC.

Marshall, Michigan

Circle Item No. 4—Reader Service Card

Book Review

Skillful Driving by Maxwell Halsey. Published by Doubleday & Company, Inc., 575 Madison Ave., New York 22, N.Y. Price $3.95.

New and experienced drivers, alike, will find *Skillful Driving* of great value because this fresh approach to our accident problem is based on traffic situations. It treats the problem of safe driving in terms of what the driver sees ahead, beside and behind him. In addition it points out what the situation means to him, what he should do about it or what he should have done before he arrived at the particular situation. In other words the title of the text could well be changed to How to Get Along in Traffic.

This is the first attempt to educate the drivers of our nation along practical lines and should serve a major need in the area of traffic safety because it will help to mould or change the attitudes and habits of the experienced driver.

There are 200 situations defined and covered in this book. If a person can master the 200 or even 100 of the most important of these situations his chances of avoiding accidents has been increased.

The organization, illustration and presentation of this material will not only catch the interest of the average driver but will hold that interest which, in turn, will educate him to practice better driving techniques and attitudes.

This book should be especially useful to driver education teachers in adult and advanced driving courses since it covers the area adequately and yet is sufficiently condensed to appeal to the adult driver. I am sure that those charged with the responsibility for re-educating the average driver will find an additional value when using this text in that it not only covers fundamental driving techniques but also places a heavy emphasis on attitudinal change.

—Ivan L. Eland, traffic safety consultant, NSC school and college division.

Summer Camps

From Page 25

rounded out by college students who assist the coordinators.

Students' fees are paid by their school's PTA, a civic club, or by the students themselves.

Although such a program may seem like all work and no play when compared to other summer camp programs, well-planned recreational activities are carried out during evenings and off-hours through the day, including swimming, softball, badminton and other sports.

Upon passing a 50 question true-false exam at the end of the session, children are graduated. In the ceremony which terminates the course, each graduate receives a certificate, a pin and a training camp T-shirt.

Examination of the child accident rate for the Washington metropolitan area shows a marked reduction in the six to 11 age group. During the 20 years the training camps have been held, not a single child has been killed going to or from school at a crossing where a student patrolman was on duty. Obviously, principals and teachers are pleased with the enthusiasm shown by returning trainees and the manner in which they perform patrol duties.

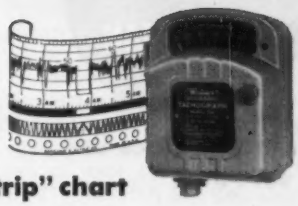
Excellent teacher supervision and extensive police cooperation—plus continuous interest and help from the AAA—give the training camp graduates the backing they need to do a first class job. The result: an efficient and smoothly functioning school safety patrol operation in our capitol's fast growing metropolitan area.

NEWS FOR TRUCK OWNERS...

NEW WAGNER-SANGAMO

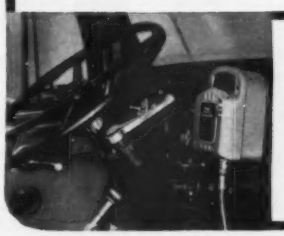
TACHOGRAPH

for EXTENDED RECORDING of truck operation... up to 31 DAYS on single "strip" chart



This new model Tachograph, when installed on the dash of each of your trucks, graphically records all starts, stops, idling time, and speeds encountered on each run. Facts are permanently recorded on strip-type charts designed for 8, 15, or a maximum of 31 days continuous recording.

Data recorded on chart helps you plan better routes, eliminate unscheduled stops, and reduce operating costs... For details, mail the coupon.



Wagner Electric Corporation
6467 Plymouth Ave., St. Louis 33, Mo., U.S.A.
Please send FREE copy of Bulletin SU-140.
Name_____
Company_____
Address_____
City & State_____
We operate_____ (Number) Vehicles WS60-2

Circle Item No. 5—Reader Service Card

Aging Driver

From Page 14

—re-training, re-examination, attitudinal changes or other actions.

4. Make a frank appraisal of his driving status and take necessary actions, which might include:

a. Attempt to adapt to the changing environment in which he operates a motor vehicle instead of resisting necessary adaptations.

b. Critically review certain areas of ability—such as, perception, reaction time, judgment time, coordination, traffic appraisals, and other items related to the operation of a motor vehicle—and attempt to maintain the highest level of efficiency possible.

c. Recognize the need for more supervision, on his part or on the part of others, in his driving.

d. Change or limit driving operations so as to minimize the risks involved.

e. Seek assistance to maintain good driving skills.

f. Frankly admit that he is no longer qualified to drive and relinquish the driving privilege.

Although the senior driver may not find that he can do these things readily, he should realize that trends are mitigating in his favor. Driver license administrators realize that more and more they will have to deal with the problems of the senior driver. The American Public Welfare Association states that by 1975 nearly half of the adult population in the United States will be more than 65 years of age. Therefore, this fact becomes a real concern in driver licensing.

Driver license administrators frankly admit that they cannot rule off the public highways all senior drivers who may have deficiencies in their driving ability. Nor do they desire to take such drastic action unless absolutely necessary. For example, they admit that if a driver has never had a traffic accident or been involved in traffic violations it will be very difficult to bar him from the highway just because he may not meet the same standards required for the average driver.

There must be recognition of substandard performance, and suitable arrangements made for more limited operation, on a need basis. Some drivers cannot be denied absolutely their privilege because their ability to live normally in society depends to a great extent on it. Because no other transportation is available, they may have to drive if they are to reach shopping centers, attend church, visit friends and relatives, participate in community activities, or other activities.

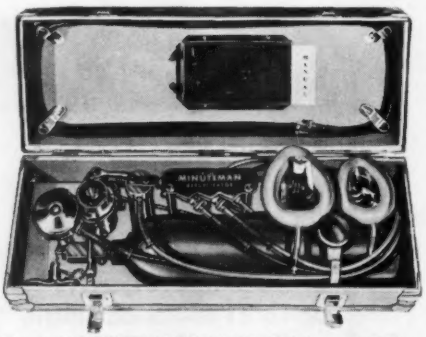
Senior drivers who face up to their problems and attempt to resolve them can expect considered and fair treatment from driver license administrators. Such administrators can be said to be in the business of keeping drivers on the highway, not in the business of removing as many as possible who do not meet reasonably high standards. Administrators will go as far as possible in satisfying the driving needs of the substandard drivers so long as such drivers act in good faith and continue to maintain good driving records.

Substandard abilities do not necessarily mean substandard driving performance; adequate compensations can be made by the conscientious driver. Obviously, when a substandard driver, or any other driver, demonstrates that he cannot, or will not, drive safely, the license administrator will find it necessary to deny or recall the driving privilege.

The senior citizen desiring to operate a motor vehicle, will find that he must face rather rigid regulations as the senior driver population increases. He must accept this fact for the safety of other users of the highways, but he should not despair. He should acquaint and identify himself with the program, adapt to its objectives, and accept its philosophy. Having equipped himself in the best manner possible, he may reasonably expect to retain his driving privileges, with possible limitations, and to continue to serve as a useful member of society. The senior driver can be an asset in motor vehicle traffic.

The STEPHENSON MINUTEMAN

saves minutes that save lives



Here's the MINUTEMAN RESUSCITATOR in a nutshell:

SMALL LIGHT — 24½" x 8¾" x 7¾". under 30 lbs. with tank.

VERSATILE — resuscitator, inhalator and aspirator, all in one instrument. With extra Midget attachment, the MINUTEMAN will resuscitate 2 patients and aspirate a third simultaneously.

ECONOMICAL — operates 40 minutes with D cylinder.

WIDE RANGE — pressures adjustable from Adult to Infant, with manual override when needed. Easily regulated to mixtures from 100% oxygen to 50% oxygen and 50% nitrogen from the air.

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☐ Please send Minuteman Folder J-27

☐ Please send free bulletin "Breath of Life"

☐ Please arrange for demonstration

NAME

TITLE

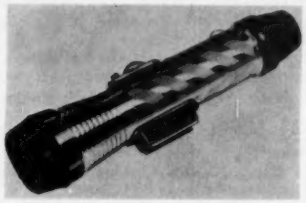
STREET

CITY STATE

Circle Item No. 6—Reader Service Card

NEW... SAFETY EQUIPMENT

Publication of product announcements in this section should not be construed as endorsement or approval by the National Safety Council.

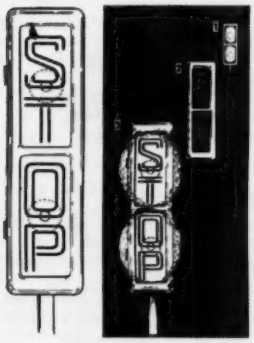


Magnet Flashlights

Model MF-340 is a 2-cell magnet flashlight with a red rear blinker. There is a separate switch for the rear blinker which has a glowing red plastic head. The flashlight has a strong permanent Alnico magnet that holds to any steel surface. The flashlight is chrome plated and has a 3-position switch with a flash button.

The flashlight uses a standard PR-2 bulb for the head light, and a standard 406 bulb for the blinker.

The H. J. Ashe Co., Inc., Glenbrook, Conn. (Item 41)



Electronic Warning Signs

"Surgelites" warning lights combine electronic flashing with neon letters. The electronic flash tubes mounted in large reflectors flash on and off, emitting intense bursts of white light, while the neon letters spell out a continuous warning. The manufacturer states that electronic flash tubes can be seen flashing 300 per cent sooner than conventional warning lights, even under adverse weather conditions.

The lights are made for toll gates, railroad crossings, bridges, etc. They can be made in any size, with any message, and any number of flash tubes operating in any sequence. The power of the flash tube is rated 20MFD capacity at approximately 900 volts. This is equal to 8 watt seconds per flash.

Electronic Lights, 1713 N. Ashland Ave., Chicago 22, Ill. (Item 42)

Reflective Traffic Buttons

A new lane-marking traffic button that stays put on highways, streets and crosswalks is easy to apply and highly visible at night. The buttons are made of polysulfide base compounds and reflective glass beads, and can be bonded to any pavement surface with a special concrete adhesive.

On heavily traveled highways, streets and crosswalks, the markers have shown a performance record of better than 99.98 per cent—meaning that less than two out of every ten thousand have failed in a six-year testing period.

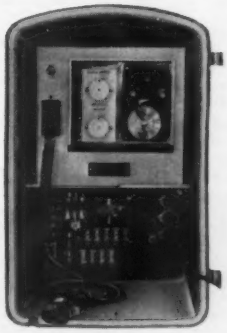
The raised, reflective button surfaces offer improved visibility at night and do not blank out even in rainy weather.

The plastic base compounds, when combined with reflective glass beads, are extremely tough and resistant to impact. The adhesive with which they are applied is a compound with similar ingredients and demonstrates a bond to portland cement or bituminous concrete, brick or granite, that is stronger than the pavement surface itself.

The life expectancy of the buttons is estimated from 10 to 15 years, and on highways will provide up to 25 years service.

The markers are four inches in diameter and about $\frac{3}{8}$ inches high, and are available in white or colors.

Thiokol Chemical Corp., 780 N. Clinton Ave., Clinton, N. J. (Item 43)



Controller

An electro-mechanical semi-vehicle actuated controller, may be used as a standard control unit. The M-20 SVA operates upon actuation of any type of detector in the street having the minor traffic movement.

The versatile controller also operates as a pre-timed control using the recall circuit. The addition of accessory units provides for guaranteed pedestrian crossing time, operation in a progressive system, right flashing, shut down, fire lane and time switch control of these features.

The Marbelite Co., Inc., 177 N. 10th St., Brooklyn, N. Y. (Item 44)

Steel Lighting Standards

Tapered steel lighting standards, mast arms and brackets for street, highway and commercial lighting installations, include bracket arms, strain poles, hinged poles and signal support standards. The company will produce tapered poles in all standard sizes and to all state and municipal specifications. These will include tapered poles in steel of 3, 7 and 11 gauge.

The company states that the tapered steel products will meet or exceed the highest standards of the industry.

Valley Mfg. Co., Valley, Nebr. (Item 45)

For More Information—Circle Item on the Reader Service Postcard

SAFETY PRODUCT LITERATURE

Stop Weeds Before They Start

A new weed control brochure contains complete directions, diagrams, applications and other useful data for Simazine (pre-emergence) and Atrazine (pre- or post-emergence) long residual herbicides. Geigy Agricultural Chemicals, Div. of Geigy Chemical Corp., Saw Mill River Road, Ardsley, N. Y.

For more details circle No. 81 on enclosed return postal card.

Why Salt-Treat Gravel Roads

Because rock salt used effectively binds aggregate and other materials tightly together and helps reduce damage to wearing course. A simple, practical 7-step method of economically salt-treating gravel roads is described in "Better Roads." International Salt Co., Inc., Scranton 2, Pa.

For more details circle No. 82 on enclosed return postal card.

Traffic Aids

Literature from Econolite Corp., 8900 Bellanca Ave., Los Angeles 45, Calif., gives full facts on these significant traffic aids: a graphic traffic counter that provides clear, accurate, continuous graphic records of traffic volume; an incandescent pedestrian signal of advanced mechanical design and legibility; a die-cast neon pedestrian signal with aluminum housing.

For more details circle No. 83 on enclosed return postal card.

Street Paving Problem?

Two brochures containing helpful information on heavy-duty, intermediate and low-cost types of asphalt construction for streets, airports and parking lots can be obtained from Texaco, Inc., Asphalt Sales, 135 E. 42nd St., New York 17, N. Y.

For more details circle No. 84 on enclosed return postal card.

Aid to Street Lighting Programmers

"A Bright City Is A Safe City" has just been published by Kerrigan Iron Works Co., Nashville, Tenn. Intended as a guide to planning and promoting street lighting programs, it contains charts and tables on traffic volume, light intensities, pole spacing and mounting heights and illustrates and describes re-lighting programs of specific communities.

For more details circle No. 85 on enclosed return postal card.

Warning Lights and Sirens

The following valuable catalogs and bulletins are available from Federal Sign and Signal Corp., 13625 S. Western Ave., Blue Island, Ill. No. 300—sirens and warning lights for police, fire, ambulance; No. 100—sirens, horns, bells and signal systems; No. 17—CD warning systems; No. 200—siren fire alarm systems; No. 107—warning lights for street and highway maintenance and construction vehicles.

For more details circle No. 86 on enclosed return postal card.

All-Metal Barricade

Literature describes a heavy 10-gauge steel barricade with square tubular steel legs of high tensile strength. It accommodates electric flashers, lanterns and pots, is easy to maintain, and has a diagonally striped black and yellow target area. Barricade Engineering Div. of Atlas Metal Products Co., 2323 N. 31st St., Milwaukee 16, Wis.

For more details circle No. 87 on enclosed return postal card.

Do Your Pavement Markings Work Full Time

Are they clean and bright during the day? Brilliant in the dark? Retain their reflectivity in fair and foul weather? Catalog B-160 can help you give your community the protection of long-lasting, life-saving traffic striping. Cataphote Corp., Jackson, Miss.

For more details circle No. 88 on enclosed return postal card.

High-Frequency F-M Radio Receiver

City officials, fire or police chiefs who want to listen to all messages sent and received by their 2-way radio-equipped vehicles, will find this crystal-controlled, fully transformer-powered unit will enable them to do so. It offers long range reception, low cost and high sensitivity. Literature gives full details. Electron Corp., Overton, Neb.

For more details circle No. 89 on enclosed return postal card.

Keeps Track of Police Cars and Fire Trucks

There is available a police control board system that displays a continuously correct inventory of squad cars—their availability and where they are. Another public safety system is a map-type display board, which shows location and status of each piece of fire equipment. Literature gives full details. General Railway Signal Co., P. O. Box 600, Rochester 2, N. Y.

For more details circle No. 90 on enclosed return postal card.

Long-Lasting Traffic Marking

A new brochure shows the latest installations and specifications of Perma-Line, a thermoplastic traffic marking material of high visibility, durability and guaranteed safety protection that applies quickly, dries almost instantly and meets the strict safety standard of the new Interstate Highway System. Veon Chemical Corp., 22-09 Bridge Plaza North, Long Island City 1, N. Y.

For more details circle No. 91 on enclosed return postal card.

Police Car Bulletin

The Dart Pursuit Brochure gives full facts on a fast, responsive solidly-built, low-priced police car, available with a wide choice of engines and transmissions, in two-door, four-door and station wagon models. Advertising Department, Box 1259, Dodge Division, Chrysler Corporation, Detroit, Mich.

For more details circle No. 92 on enclosed return postal card.

For Safe, Nonslip Concrete Services

A. I. A. File No. 3-D describes and gives recommended applications and specifications for silicon carbide and aluminum oxide abrasive grains, which provide an inexpensive and simple method of making concrete surfaces non-slippery and safe. Frank D. Davis Co., 3285 E. 26th St., Los Angeles 23, Calif.

For more details circle No. 93 on enclosed return postal card.

Fluorescent Safety Paint

The Lawter Chemicals, Inc., 3552 Touhy Ave., Chicago 45, Ill., have made available a color brochure on HI-VIZ fluorescent colors that make street signs, waste containers, fire hydrants, warning barricades, emergency vehicles, etc., 4 times brighter.

For more details circle No. 94 on enclosed return postal card.

Brake Products

The Parts and Accessories Division of Wagner Electric Corporation has made available two new automotive brake product catalogs. The Wagner Lockheed AU-500 wholesaler catalog and the AU-1 dealer catalog have been expanded to include power brake repair kits and many other additions and changes in the Wagner Lockheed line. New type-faces and edge-marked index add to the quick reference advantages of these catalogs. Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 33, Mo.

For more details circle No. 95 on enclosed return postal card.

Reflective Traffic Markings

White or yellow, Catatherm reflective plastic pavement striping can be hot extruded directly and securely onto any pavement, and is said to outlast paint stripes 9 to 26 times. Literature gives full details. Cataphote Corp., Toledo 10, Ohio.

For more details circle No. 96 on enclosed return postal card.

New York Law

From Page 11

Another expression of recent scientific opinion in this field was made by a special committee of the British Medical Association in its recent report which was approved by the council of the association early this year. This committee, which examined the relation of alcohol to road accidents, had this to say, as reported by the *British Medical Journal:* "The committee considers that a concentration of 50 mg. of alcohol in 100 ml. of blood (0.05 per cent) while driving a motor vehicle is the highest that can be accepted as entirely consistent with the safety of other road users. While there may be circumstances in which individual driving ability will not depreciate significantly by the time this level is reached, the committee is impressed by the rapidity with which deterioration occurs at blood levels in excess of 100 mg./100 ml. (0.10 per cent). This is true even in the case of hardened drinkers and experienced drivers. The committee cannot conceive of any circumstances in which it would be considered safe for a person to drive a motor vehicle on the public roads with an amount of alcohol in blood greater than 150 mg./100 ml. (0.15 per cent)."

Evidence Weighed

Other studies in a number of countries point to the 0.10 per cent blood alcohol level as the point of definite impairment even where the most hardened drinkers and most experienced drivers are involved.

With such evidence at hand and with the general disregard shown for levels between 0.05 per cent and 0.15 per cent under the present statutes, the use of the 0.10 per cent blood alcohol level as our dividing line was a natural development.

The second apparent area for improvement in our New York law involves the reluctance of many prosecutors to prosecute and juries to convict under it. In requiring that the drinking driver be classified as a criminal, the law has proved inadequate to remove the drinking driver from the highway in many areas. In branding the drinking driver as a felon or a misdemeanant, the law increasingly became effective only against the more serious offenders. That this problem was not restricted to New York State is shown by the fact that the committee of the British Medical Association, mentioned above, found that a similar situation existed in England.

The second point of focus, then, was to improve the chances of removing drinking drivers from the highways simply by providing an offense intermediate in nature for which it would be easier to obtain conviction. Thus, the new charge, driving while ability is impaired by alcohol, was made a traffic infraction, thereby removing the stigma of criminality which had proved a bar to prosecution and conviction.

A further bar to such prosecution and conviction had been the requirement that the licenses of individuals convicted of driving while intoxicated be revoked for at least six months. Conviction of the new traffic infraction, however, will result in mandatory license suspension for 60 days in the case of first offenders, 120 days in the case of second offenders and a minimum six month license revocation for a third conviction within three years.

Two other aspects of the new legislation deserve mention. As a protection for the accused, no conviction for driving while impaired by alcohol may be had without a chemical test showing 0.10 per cent or more by weight of alcohol in the blood of the accused. In order to assure that such tests are available as evidence, drivers refusing to submit to chemical tests will be subject to revocation, as they are presently in the case of a charge of driving while intoxicated.

It is important to note that our new statute is an addition to the law and not a sustitution. All of the pro-

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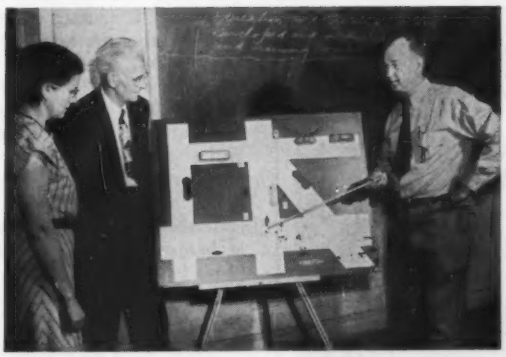

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Here is an aid that has proven practical in teaching visually the principles of safety. It's simple, effective and works wonders in teaching your drivers.
The MAGNO SAF-T BOARD is the result of studies by outstanding safety instructors and engineers. Safety directors, traffic managers, driving instructors, insurance agents and adjusters get a clear picture of how accidents occurred visually by reconstruction of conditions.

It is now being used from coast to coast by fleet owners, insurance and public utility companies, colleges and schools, and many other concerns interested in public safety. Consisting of a BOARD with typical street intersections on one side. The other side is a BLACKBOARD on which any street or road situation can be drawn with chalk and then erased. It has scale models of vehicles, traffic markers and accessories that can be placed in any conceivable traffic situation.

Write for our folder. It contains full information.

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Circle Item No. 7—Reader Service Card

Circle Item No. 8—Reader Service Card

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MAGNETIC
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Board consists of (3) interchangeable sections—14" x 22" each—Enables you to simulate various intersections. Back has replica of 4 lane highway and blackboard surface for special situations.

World-wide acceptance by driver education instructors, insurance adjusters, lawyers, magistrates and safety engineers.

Scale model vehicles and traffic equipment supplied.

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Circle Item No. 9—Reader Service Card

New York Law

From Page 47

visions prohibiting driving while intoxicated which existed before the adoption of the new statute have been retained. Conviction of driving while intoxicated will still constitute a misdemeanor and result in a minimum mandatory six-month revocation, and the same standards of evidence will apply. The new charge of driving while ability is impaired should provide an additional weapon with which we can discourage the drinking driver.

Basically and importantly, the new statute is intended to be effective in those cases in which our existing law has proved ineffective. To us in New York State, it represents a move into an area which was generally unoccupied even in the face of obvious need.

New Step Is First Step

I regard this pioneering legislation, the first of its type in the United States, as a significant step toward reducing the human toll taken by highway accidents. Traffic safety in this motorized era is a critical area of human concern and one in which we must be alert to every opportunity for improvement. Productive research, a sympathetic public, an alert Legislature, and administrative imagination have provided a substantial opportunity in this instance. I believe that our recent action in New York is another example of the Empire State's leadership, and I am proud of our demonstrated ability to be bold as well as big. •

New York's experience, beginning October first under this fresh concept, will, I know, be of substantial interest throughout the nation to those who are seeking a realistic approach toward reducing the tragic toll of death and injury caused by the drinking driver.

THE MARK OF THE PROFESSIONAL SAFE DRIVER

Challenge of the Age

From Page 17

strength and their safety at work is a national concern."

This one phrase should be repeated over and over—"to meet the competition of our age."

The President is not just talking about safety here. He is urging us to think and act in terms of *survival* as well as safety. He is speaking from a knowledge of these times that has him moving personally from capitol to capitol around the world, doing his utmost to represent us as a responsible nation.

Elsewhere in the world, as the Vice President so eloquently put it the other morning, powerful voices are contending otherwise. Efforts are being made to prove that our downfall is inevitable. We are described as anything but competent to lead the world to better and more peaceful years for all. In the meantime, here at home, the controversy grows as to whether we have enough of this or that to meet the challenge of these times. The taxpayers are restless under the cost of it all and wondering about many things.

This is the atmosphere in which the President says to this conference, "America needs an ever-increasing number of skilled working men and women. These are the nation's pride and strength, and their safety at work is a national concern."

From our experience we know if their safety at work is a national concern, their safety, and that of our entire population, is vital not only on the job, but off the job as well.

In 1959, six out of seven of all accidental deaths occurred *away* from work. Four out of five of all accidental injuries occurred *away* from work. In 1959 more than twice as many workers were killed by accidents off the job than on the job. The actual figures—13,800 died on the job, and the same work force moved through the plant gates and 29,800 of them died before they could return to their jobs.

Accidents are directly responsible for one of the most tragic and wasteful single burdens on our national life today. In meeting the competition of our age we can't afford the cost of accidents, nor do we as those most responsible for accident prevention believe they are necessary.

Still, 91,500 were killed in 1959—77,700 of these deaths were the result of non-work accidents. Of the 9,100,000 injured, 7,300,000 were injured off the job. The cost to the economy of non-work accidents last year alone was eight billion dollars.

Percentage-wise, work accidents in 1959 constituted only 14 per cent of our national accident problem. Traffic accidents added up to 39 per cent of the total; home accidents 29 per cent, and public accidents 18 per cent.

We find it impossible to believe that it is feasible, practical, or desirable from the standpoint of the President's admonition to this conference, or to us as individuals, to even think of setting any one segment of this four-part problem to one side and by concentrating on it alone consider our duty done. It's like trying to separate the Four Horsemen of the Apocalypse instead of recognizing them for what they are—a team of terrors.

Unfortunately, it's not unusual for us to be inconsistent in our attitudes toward comparably important responsibilities, even where our personal welfare is inevitably concerned. For example, how many of us would want to rear our families under circumstances where the church was no better organized or supported to meet its responsibilities than is the cause of accident prevention in so many of the localities in which we live?

To be sure, there are differences in the missions of accident prevention and the church, but there are undeniable similarities, too—the preservation of life—the alleviation of human suffering and the pursuit of happiness.

Certainly all of us would agree that accident prevention is Christianity at work.

So—to quote from *Safety in the 60's:*

"As we enter the seventh decade of the twentieth century, it is the hope of the National Safety Council that its effort to lift our sights, together with a prudent examination of nearly half a century of organizational experience, will result in a new dedication to and deeper insight into the high calling of a worker for safety as well as in making sensible and realistic plans for providing for the accident prevention needs of the 60's."

Seat Belts

From Page 27

activity from the Roanoke chapter of the National Secretaries Association.

Next, Ann conceived the idea of holding a summer exposition to promote traffic safety in the community. The ballroom at Rockledge Inn atop famous Mill Mountain was obtained and she enlisted the support of women's clubs to prepare individual exhibits. She directed their activities and took charge of promoting the exhibition to the public. With her idea of a summer traffic safety exposition, Ann succeeded in bringing into play the efforts of many groups who had not previously worked in safety. The exposition consisted of 15 exhibits by women's clubs of the Roanoke Valley area. It was publicized by running a contest to select a theme for the event on Ann's television show Panorama, which was also the vehicle used to present Roanoke Safety Council's official commendations to all the participating women's organizations.

Talked To Teens Also

Miss Howard presented a talk to the Roanoke Valley Y-Teens which led to a special safety drive that culminated in a safety conference. Ann acted as advisor to the teens in the project and as the panel moderator on the day of the conference.

The following autumn, Roanoke held its first annual harvest festival and Ann urged the safety council to enter a car in the parade, along with one provided for the Y-Teens. Both cars carried safety messages which were seen by a crowd of about 50,000. Another 100,000 people saw Miss Howard's Roanoke Fall Fair display that centered around an elaborate sign made up for her by a local bottler. At this display Ann herself distributed 3,000 copies of the booklet she rewrote, "Safety Belts Save Lives."

The results of Ann's efforts are impressive:

Her safety messages were seen or heard by 225,000 television viewers —75,000 at the fall fair, 25,000 at a football game and 5,000 at the traffic safety exposition.

There was an increase of 50 per cent in the number of women's groups that initiated or took part in safety programs. Individual safety council memberships increased about 75 per cent in the local council.

A major result of Ann's campaign, it's been agreed, was the installation of 1,000 auto seat belts in automobiles throughout the area. This was aided by Ann's distribution of 8,000 copies of the safety belt pamphlet and 4,000 bumper stickers.

Five local companies decided to install seat belts in their company cars.

Ann Howard's achievements clearly illustrate the importance of obtaining the right people in the community to generate enthusiasm for the program and to communicate that enthusiasm to the citizenry. Her advice to those considering a similar program might well be: "Select your support group carefully before buckling them into their program chairs when taking off on a traffic safety project."

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989 West King Street Decatur, Illinois

Circle Item No. 10—Reader Service Card

Legislative Hopper

From Page 20

Executive Action

Massachusetts—H. 2401—requires advising person accused of drunk driving of right to be examined by physician—approved.

New York—S. 638—makes person guilty of traffic infraction who operates vehicle while ability to do so is impaired by alcohol—approved.

Virginia—S. 247—relates to suspension and restoration of driver license of person committed to institution for habitual use of drugs or alcohol—approved.

Motor Scooters—Motorcycles

Action and Additional Information

Michigan—S. 1121—permits carrying of number of passengers that motor driven cycles are designed to carry—killed, Senate.

Miscellaneous

New Bills Introduced

Arizona—H. 270—provides for fatigue inspection of all motor vehicle operators at state borders. *H. 280*—provides new traffic safety code, including provision for driver license point system.

Hawaii—HR 19—requests the traffic safety committee to make a study of pedestrian cross-walk safety.

Kentucky—H. 534—authorizes department of public safety to cooperate in designation of suitable locations for drag strips.

Mississippi—H. 444—provides for enactment of new motor vehicle safety responsibility act.

Action and Additional Information

Arizona—H. 146—prohibits hitchhiking—passed House.

Executive Action

California—HR 10-X—requests that courts require litter bugs to remove debris from highways—adopted.

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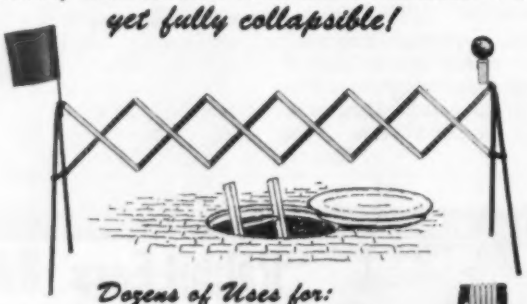

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Parking Fines

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plishes a great deal more than the original purpose. For example, the parking situation is very acute in the vicinity of the city hall. We feel that more than 49,000 parking spaces have been made available for other business. It has reduced the number of warrants served for late parking bond collections.

It has had a very fine effect upon relations with the public. People do not like to face another person when posting a traffic bond of any kind. Effecting this transaction through a mechanical device seems to relieve much of the bad feeling that existed in the past.

The bond schedule for overtime parking is $1.00 if posted within one hour of the time it is written. In the past it was almost impossible for people to drive to the city hall, find a parking space, and get to the violations counter within the one-hour time limit. This device has made it possible for many more people to take advantage of the $1.00 fee.

For the total amount of money expended we feel that this snorkel has paid for itself many times over. Assisting in its construction were Robert Strand of the radio section and Louis Baker of the alarm and signal division. All installation was done through city labor.

Traffic Safety

Vol. 4 No. 2
June 1960

RESEARCH REVIEW

A NATIONAL SAFETY COUNCIL PUBLICATION

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Director, Research Division
National Safety Council

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The RESEARCH REVIEW is a quarterly supplement published by TRAFFIC SAFETY for the reporting of research that relates to traffic safety. This service is designed to provide those who conduct research, and/or utilize research findings, information that contributes to, advances, or clarifies the body of traffic safety knowledge. The value of research and the prevention of duplication and overlap is enhanced by prompt reporting. To fulfill this purpose, the RESEARCH REVIEW will present completed reports, abstracts, summaries of research in progress, and information regarding contemplated research.

The opinions expressed and conclusions drawn are entirely those of the various authors of these papers. TRAFFIC SAFETY and the National Safety Council accept no responsibility for them, and publication should not be deemed as either endorsement or approval of the ideas expressed or devices described.

Manuscripts appropriate for publication should be submitted to the Research Division of the National Safety Council, 425 North Michigan Ave., Chicago 11. Manuscripts cannot be returned unless accompanied by a self-addressed, stamped envelope. Editorial handling will be easier if manuscripts are typed, double-spaced in triplicate, and accompanied by an abstract of 200 words or less and all original art work. Any other information regarding research in progress or contemplated research can be submitted in any form that outlines the full particulars, i.e., investigator, problem, hypotheses, methodology, desired or expected outcomes, etc.

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Author biographies and editorial viewpoint.

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As mileage goes up—grades go down.

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Young males most frequently involved.

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RESEARCH BRIEFS

With the major portion of the available space in this column being occupied by authors' biographies, we will not attempt to summarize the articles in this issue. Rather, we will take the opportunity to discuss those phases of research which the investigator, in his preoccupation with problem and method, usually tends to pay little consideration.

In the glare of practical realities, research to be complete must first be financially supported, and then its findings must be developed, implemented, and applied. The uncovering of truth and fact is of itself not enough to solve the problems that beset us in the traffic safety fields today. Many significant findings lie hidden in dusty files, buried in unread journals or have been delivered in talks where the full importance of the facts either did not register in the minds of the audience or were couched in terms which did not permit the application phases to be readily discernible.

Some investigators do not care to concern themselves with application while others lament the fact that their findings appear to be overlooked or ignored. They say that we cry out for truth yet we are slow to accept it. Such industries as automotive, transport, petroleum, and insurance are often maligned and become the subject of emotional diatribes because they do not immediately utilize or implement the findings from the laboratories and the tests.

In their defense it must be recognized that a major share of financing of research in this country is supported directly by the industries mentioned. Exclusive of Federal support we will find their monies underwriting or supporting the largest part of the research now being carried on. For example we will find many hundreds of thousands of dollars, even millions, being dispensed through such organizations as Chrysler, Ford, and General Motors, Standard and Pure Oil, Allstate Insurance Company and Liberty Mutual Insurance Company, through such associations as the American Automobile Association, the American Trucking Association, the Automotive Safety Foundation, the Esso Safety Foundation, and a number of others.

In a recent statement from Russell I. Brown, president of the recently formed Insurance Institute for Highway Safety, he stated, "The Insurance Institute for Highway Safety will consider assisting in the financial support of traffic safety research that is related directly to the Action Program of the President's Committee for Traffic Safety and which has a direct bearing on either its effectiveness or on methods of achieving application of it."

We find that through the Esso Foundation a broad and comprehensive educational program is carried on. Hundreds of scholarships and grants-in-aid are made to further driver education, legal training, police training, traffic engineering, motor vehicle administration and public information, and community support.

The Ford Motor Company through its traffic safety and highway improvement department is constantly taking the findings of research and bringing them to the attention of both the professional and the lay public. The well substantiated data regarding seat belts has been incorporated in an excellent booklet entitled *The Big Plus* and has had an initial printing of 50,000 copies. Copies of this booklet can be had upon request and furnish an example of how important research can be made understandable to the general public and to serve through education to put positive findings into practice.

General Motors, faced with the knowledge that off-the-road accidents and fatalities were increasing and that inattentiveness or falling asleep at the wheel may have a direct bearing on this, has recently developed an electronic auto warning buzzer that would signal the nearness of the pavement edge. In fact, this device can signal either pavement edge or crossing the center line. Its financial feasibility or saleability may be an item separate and apart; nevertheless, the company has faced the problem and arrived at a solution which may be workable.

We cannot afford to become academically provincial or overly ego-involved with our own aspect of research. It takes many people and many groups working in coordination and harmony to determine a problem, to uncover its solution, to define the basic truths and principles, to develop them, apply them, put them into practice and evaluate their results. It is incumbent upon all the supporters of research, the doers of research and the users of research to realize that we all have the same objective: the reduction of and, we pray, the eventual elimination and eradication of traffic accidents and fatalities.

John J. Flaherty

THE AUTHORS

J. Keith Kavanaugh

Dr. Kavanaugh has been principal of Niles Township High School in Skokie, Illinois, since August, 1958. Prior to that he was principal of the W. K. Kellogg School in Battle Creek, Michigan.

A graduate of Illinois State Normal University, he also holds M.A. and Ph.D. degrees from the University of Chicago. While in graduate school he was on the research staff of the Midwest Administration Center. He is an active member of many educational civic associations.

Warren A. Kemper

Mr. Kemper is research manager of the Allstate Insurance Companies at its national headquarters in Skokie, Illinois. For most of his 13 years with the company, he has been specializing in underwriting research. His most recent studies have been concerned with isolating and identifying characteristics in motor vehicle operators which lead to accidents. For the past year, his attention has been drawn to the accident propensities of young drivers, particularly high school drivers. The high school driving studies, Mr. Kemper reports, are, in reality,

a prelude to accident proneness studies he is about to conduct on college students and employed young drivers.

A casualty underwriter by profession, Mr. Kemper was for several years the underwriting manager of the company's Philadelphia Regional Office. He is a member of the American Statistical Association.

E. R. Klamm

A nationally known traffic safety authority, Mr. Klamm is the accident prevention director of the Allstate Insurance Companies. He has served in this capacity since 1951 and has been in the safety field since 1938. One of the pioneers in the driver education movement, Mr. Klamm has recently been recognized by the Illinois Driver Education Association for outstanding service in the development of high school driver education in the state.

A graduate of Northwestern University, Mr. Klamm served as a member of the Evanston Police Department and has been associated with the Northwestern University Traffic Institute for many years.

Mr. Klamm is a member of the American Association of Motor Vehicle Administrators, National Safety Council, American Society of Safety Engineers, Institute of Traffic Engineers, and Illinois State Chamber of Commerce. He is also president of the Arlington Heights Area (Illinois) Traffic Safety Council.

Henry C. Freimuth

Since 1944, Dr. Freimuth has been toxicologist in the Office of the Chief Medical Examiner of Maryland. He is also on the staff of the University of Maryland Medical School, Loyola College, Maryland State Police Training School, and the Baltimore City Police Academy, and has been guest lecturer at the Harvard Medical School.

After receiving the B.S. degree from City College of New York, Dr. Freimuth obtained his M.S. and Ph.D. degrees from New York University, while holding teaching and research fellowships. He was analytical chemist in the Federal Bureau of Investigation from 1939-1944.

Dr. Freimuth holds memberships in the American Chemical Society, Society of Sigma Xi, Phi Lambda Upsilon, American Association for the Advancement of Science, American Academy of Forensic Sciences in which he was chairman of the Toxicology Section from 1955-1957, and the Maryland Association of Public Health Laboratories. He has published numerous articles.

Bernard I. Loft

Dr. Loft, associate professor of health and safety at Indiana University, has had a wide teaching experience, including Michigan State University and the University of Florida. He received his doctorate in health and safety from Indiana University, and his masters and bachelors degrees from the University of Florida and State Teachers College at Westchester, Pennsylvania, respectively.

A member of Phi Delta Kappa, Kappa Delta Phi, and Phi Epsilon Kappa, he has been active in various phases of safety with numerous civic and service organizations, including the American Automobile Association, American Red Cross, City of Bloomington, Indiana, and the U. S. Naval Reserve. He is vice president of the American Association for Health, Physical Education, and Recreation and chairman-elect of its new Safety Education Division.

He is vice-chairman of the Higher Education Section, and a member of the School and College Conference, National Safety Council. Dr. Loft has written numerous articles and texts on safety and is in frequent demand as a speaker.

David Solomon

Mr. Solomon has been a highway research engineer in the Bureau of Public Roads for the past seven years, the last eighteen months of which he has been on the staff of the recently created Division of Traffic Operations. He is a graduate of the University of Colorado and attended the Yale Bureau of Highway Traffic.

Roger G. Stewart

Roger G. Stewart has been employed as a research phychologist in the Institute of Transportation and Traffic Engineering of the University of California and in the Department of Motor Vehicles of the State of Oregon.

In 1951, he received his Ph.D. degree in psychology from the University of Illinois, with major emphasis on experimental design of research studies, construction and validation of tests, and statistics. One of his chief interests lies in possible applications of these activities to problems in various fields of safety.

He is a member of the American Psychological Association. He is also certified as a psychologist under laws of the state of California.

Spencer R. Watts

During the period from 1951-1957 when Mr. Watts was employed as a chemist by the Office of the Chief Medical Examiner of Maryland, his duties were the analysis of tissues and fluids for toxic substances. He is presently employed as a supervisory chemist in the Pennsylvania Department of Health, Occupational Health Laboratory, a position which he has held for the last two and a half years.

A graduate of Morgan State College where he received the B.S. degree in Chemistry, he is presently doing graduate work at Franklin and Marshall College. Mr. Watts is a member of the American Chemical Society, The American Conference of Governmental Industrial Hygienists, the American Industrial Hygiene Association, and the Pennsylvania Public Health Association.

Russell S. Fisher

In addition to serving as Chief Medical Examiner of the State of Maryland, Dr. Fisher is on the staff of the University of Maryland and Johns Hopkins Medical Schools and the Medical College of Virginia.

A graduate of the Georgia School of Technolgy where he received the B. S. degree in Chemical Engineering, Dr. Fisher obtained his M.D. from Medical College of Virginia in 1942, did graduate work in legal medicine at the Harvard Medical School and was certified in Pathologic Anatomy in 1950.

Dr. Fisher is a member of the American Medical Association, American Association of Pathology and Bacteriology, College of American Pathologists, American Society of Clinical Pathologists, American Academy of Forensic Science, British Association of Forensic Pathologists, and state and local organizations.

THE HIGH SCHOOL STUDENT AND THE AUTOMOBILE

by J. Keith Kavanaugh
Warren A. Kemper
Edward R. Klamm

A study of the effects of car use and ownership upon the scholastic standings of junior and senior students at Niles Township High School, Skokie, Ill.

Automobiles play a role in the lives of almost everyone in this country . But there is perhaps no group to which the automobile is more important than today's teenagers. More than just a means of transportation, to these youngsters the automobile is a symbol of prestige, social status, and most of all, the maturity and freedom they are so eager to assume.

In many cases, particularly among teenage boys, the automobile has become one of their major focal points of existence. Much of their free time is spent driving automobiles, tinkering with automobiles, reading, talking, thinking and dreaming about automobiles.

Although most of us have observed this adolescent motor-mania and are aware that it is affecting teenagers in many ways, there have been relatively few studies made of the influence of the automobile on specific elements of teenage life.

One of the few areas where we have concrete studies on youngsters and automobiles is the compilation of statistics on young drivers made by the automobile insurance industry. These figures reveal that, as a group, they are involved in, and cause a greater percentage of accidents than any other group. Consequently, as insurance risks, they are a source of concern to the industry.

Since in this age group, young men do most of the driving, the number of women drivers under 25 who drive extensively has not reached significant statistical proportions. Thus, when insurance companies consider this group, it is the young men drivers to whom they refer.

The Allstate Insurance Companies, along with other leaders in the insurance industry, has held the opinion that one reason for the bad driving records of youngsters is lack of proper training in safe driving techniques and attitudes. After considering the various ways in which youngsters learn to drive, the insurance firm concluded that the best method of training youngsters in safe driving is in the high school driver education program, where teenagers have the benefit of instruction by qualified teachers trained for the purpose, and when they are at that age when motor-mania is approaching its peak.

Young driver discounts

Early in 1953 the management decided to express in a dollars-and-cents manner its faith in high school driver education. At that time, prompted by its Safety and Underwriting Departments, it offered an insurance premium discount of up to 15 per cent to young drivers who had successfully completed approved high school driver education courses. At the same time, through The Allstate Foundation, a series of grants was made to colleges and universities throughout the country for the purpose of setting up courses to train high school driver education teachers in the proper methods of instructing youngsters in sound driving techniques.

By the start of 1959, at the end of six years of the discount plan and the Foundation Grant Program, the organization had acquired the statistics it needed to back up its faith in high school driver training.

In April, 1959, Jack H. Walgren, Automobile Underwriting Director, announced, "Our figures substantiate, for us, the often heard axiom that trained drivers have half as many accidents as untrained drivers."

Trained drivers better risks

Now, one might suppose that, having established that high school trained students were worthy insurance risks, Allstate might be justified in accepting that fact and letting it go at that. But, there were still certain questions unanswered.

Knowing that a sense of responsibility plays an important role in driving performance, it might be assumed that those students who took driver education courses had, by their very interest in learning to drive safely, already displayed this sense of responsibility. Consequently, the actual driving records of high school trained drivers might be as much a testimony to the student's own maturity as to the effectiveness of the courses. They might even be good insurance risks if they had never had high school driver training at all, but learned to drive from relatives or friends.

The companies' Accident Prevention Director Edward R. Klamm and Warren A. Kemper, Manager of Underwriting Research, discussed the need for additional information on young drivers and drafted a program of comprehensive research in this area.

Since the insurance firm's home office is located in Skokie, Ill., it was logical to begin this research program at a high school in the immediate area. Dr. Keith Kavanaugh, principal of the Niles Township High School of Skokie,

was approached by the Klamm-Kemper team and saw immediately the value of such a study, both to the investigators and to educators.

In discussions with Dr. Kavanaugh, the concept of the original study was broadened to include a survey of the relationships between the ownership and driving of cars and the scholastic performances of high school students. It was Dr. Kavanaugh who suggested to the research group that the question of part-time jobs be included in the survey. He had observed a relationship between scholastic performance and part-time student jobs and suspected that the two could be linked to car use and ownership. Under his direction, a series of questions was prepared to explore these relationships.

Three main objectives

Three main objectives were set up:

1. To explore the inter-relationship of grades, jobs and car usage at the high school level.
2. To evaluate the effectiveness of high school driver training as an accident deterrent.
3. To measure the attitudes of high school students toward the use of cars by members of their own age group.

Since the survey was mainly concerned with student driving, it was decided to confine the study to the junior and senior class, since it seemed unlikely that many of the younger high-school students would drive to any great extent. The group surveyed at Niles Township High School consisted of 1455 junior and senior students.

Niles Township High School serves a populace which is generally in the upper middle income group. More than 80 per cent of the graduates go on to college. School transportation and public transportation facilities are such that few, if any, students find it absolutely necessary to drive, or be driven, to and from school.

The survey was conducted by means of questionnaires which were filled out by the students at school. To obviate the possibility of getting answers influenced by the parents, or answers designed to please the school faculty, the students were not allowed to take the questionnaires home, but were required to fill them out during study periods.

The forms were distributed to all junior and senior students whether or not they had use of a car or owned a car themselves. The non-driving students formed a control group in the final comparison of scholastic standings and other factors examined in the survey.

The students were asked to supply information on whether they could drive, how they were taught to drive, whether they had use of the family car or owned a car, how often they used a car for social and other purposes, and whether they contributed to the upkeep of the family car. Students were also questioned about part-time jobs and whether they were obtained in order to contribute to the upkeep of the family car or student-owned cars.

72% OF THE STUDENTS HAVE LEARNED TO DRIVE

57% of the girls	87% of the boys
64% of the Juniors	84% of the Seniors

HOW STUDENTS LEARNED TO DRIVE

19% High School Driving Course
10% Commercial Course
59% Parents
4% Other Adults
3% Brother or Sister
5% All Other

OF THOSE STUDENTS WHO DRIVE A CAR

1 out of 2	Drive to school. Out of these about 1 out of 4 drive daily.
1 out of 3	Drive to and from a job.
1 out of 8	Use car in a job.
3 out of 4	Use car for social purposes and nearly half of these average 3 or more nights a week.

The survey also attempted to ascertain student viewpoints on high school driver education courses and whether they were considered desirable before students applied for driver licenses. In addition, students were asked to comment on young drivers in general, excluding themselves.

Distribution of the questionnaires began in May, 1959, and completed forms were returned to the research group within a week. From then until the end of July, the research team worked over the results, interpreting the answers in terms of teenager's classroom performance, homework assignments, spare-time jobs, dates, and *the degree of parental latitude given them*. This latter turned out to be one of the most significant findings of the survey.

Parental control vital

For, through the mass of statistical data gathered in the survey, one conclusion stood out: *Parents who allowed a student the unrestricted use of the family car or the student's own car could expect the student's scholastic standing to drop*. And the brighter the student, the more sharply his grades would fall.

ARE BOYS POORER STUDENTS THAN GIRLS? IT WOULD APPEAR SO — 33% OF THE BOYS ARE IN THE LOWEST 25% OF THEIR CLASS

Grade Ranking

	MALE	FEMALE
1st Quarter	21%	30%
2nd Quarter	22%	29%
3rd Quarter	24%	25%
4th Quarter	33%	16%
	100%	100%

The masculine pronoun is used advisedly here, since the conclusions of the survey apply mainly to high school boys. The number of high school girls who drive extensively turned out to be so small as to be insignificant to the survey.

BUT WHEN THE INFLUENCE OF THE CAR IS REMOVED, THE BOYS ARE EVENLY DISTRIBUTED THROUGH ALL QUARTERS

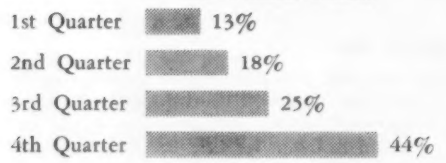
Grade Ranking

	MALE
1st Quarter	25%
2nd Quarter	26%
3rd Quarter	23%
4th Quarter	26%
	100%

One of the basic questions of bias (in the scholastic area), is the possibility that (1) boys are not as good students as girls and (2) boys do most of the driving; thus which is cause and which is effect. To an extent the second chart helps clarify the picture. This chart excludes 'boys who use car to drive to school.' This is admittedly an arbitrary approach and by no means answers conclusively the question in its entirety. The national study presently underway should resolve this.

The students most likely to own cars were found generally to be those who were among the lowest one-fourth in scholastic standing, the survey determined. After they acquire a car, their study time is reduced as they spend more time driving, consequently, there is little chance that they will improve their grades. In effect, *car ownership tends to solidify these students in their lower-quarter position.* In addition, the students who own cars lose additional segments of available study and homework time when they obtain part-time jobs in order to pay for the maintenance and operation of their vehicles.

17% OF THE STUDENTS OWN CARS AND OF THESE CAR OWNERS, 44% ARE IN THE LOWEST QUARTER OF THEIR CLASS



But the most damaging effect of car ownership was found among those students who formerly ranked in the top one-fourth of their class. Like the other students, their grades dropped when they became car owners, but the drop was comparatively drastic. The survey showed that *when these bright students became car owners, 87 per cent of them dropped sharply in scholastic standings.*

CAR OWNERS TEND TO BE WORSE STUDENTS, BUT: HOW DID THEY RANK BEFORE GETTING THE CAR?

Car Owning Juniors

	Ranking As Sophomores Prior to Getting Car	% Whose Grades Deteriorated After Getting Car
1st Quarter	18%	87%
2nd Quarter	19%	53%
3rd Quarter	20%	75%
4th Quarter	43%	31%

A parallel situation is found when parents allow high school students to use the family car extensively. All grades drop, but the worst drop is felt by the brightest students.

Evening driving

The ownership or availability of a car imposes a double burden upon the free time a student might normally use for study, according to the survey. A car expands the student's social horizon, requiring more time away from studies. Students who used cars for social purposes revealed that the times a car was used varied from one evening a week to seven evenings a week.

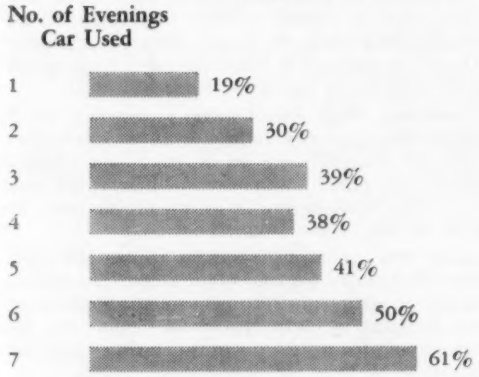
Of those whose parents allowed use of the car *every evening in the week,* 61 per cent were in the bottom quarter of the scholastic standings. Of those who could use a car only one night a week, 19 per cent were in the lowest quarter.

SOCIAL USAGE OF CARS BEARS DIRECTLY ON STUDENTS' GRADES

The students were asked:

1. Do you use car socially?
2. If used socially and in the evening, how many evenings a week do you average using a car?

Boys Only
% In Bottom Quarter Of Class



In addition to requiring additional time for an expanded social calendar, car usage and ownership imposes financial obligations on the high school students, operating and maintenance costs which obliged nearly half of the car owners to obtain part-time jobs. Thus, additional hours were lost which were reflected in a further drop in grades.

Part-time jobs

Part-time jobs held ranged from week-end jobs to those requiring the student to work every week-day evening, or a combination of week-night and weekend hours. Student drivers who worked an hour or two on week-nights suffered scholastically. The short work period each day apparently caused a serious disruption of the continuity of the student's schedule and affected his grades in a marked manner. When the work was concentrated on weekends, the disruption to the schedule was not so noticeable.

PART-TIME JOBS

Excessive hours worked have deteriorating influence on grades. Exception: If work is restricted to weekends only, the number of hours is relatively unimportant)

Hours Worked Per Week
(week-days and weekends combined)

	less than 12 hours	12-23 hours	more than 23 hours
1st Quarter	60%	15%	6%
2nd Quarter	10%	19%	21%
3rd Quarter	10%	24%	22%
4th Quarter	20%	42%	51%
	100%	100%	100%

Notice the heavy concentration of job holders working less than 12 hours a week who are in the top quartile in scholastic rank and compare this with the 'more than 23 hours per week group' which placed only 6% in the upper quartile.

The 'less than 12 hour' group was principally composed of week-end job holders only. Monday through Friday job holders tended to be poor scholars generally—regardless of number of hours worked.

PART-TIME JOBS AND THEIR INFLUENCE ON SCHOLASTIC STANDING

Boys—1st Quarter
Influence On Grades
Those Who Own Cars

Have Jobs (62%)	Do Not Have Jobs (38%)
Juniors	Juniors
83% went down	100% went down
Seniors	Seniors
83% went down	75% went down

So serious was the interruption caused by week-day jobs that Dr. Kavanaugh, reviewing the results of the survey, said, "If a student must work, I would prefer that he work a full day on Saturday rather than an hour or so every school day."

In determining the influence of the car upon student's classroom performance, the researchers made a special effort to determine the influence of the car alone upon grades. Knowing the effect of car ownership plus part-time jobs upon student grades, they also wanted to determine the effect of car ownership without accompanying jobs. They therefore paid special attention to those students who owned cars, or had the use of cars, but did not have jobs.

Taking these as a group, the researchers found that 100 per cent of them suffered a drop in grades after they began to drive!

Where There Is No Car Ownership

Have Jobs (36%)	Do Not Have Jobs (64%)
Juniors	Juniors
47% went down	51% went down
Seniors	Seniors
46% went down	52% went down

We see that nearly two-thirds of the car owners have jobs.

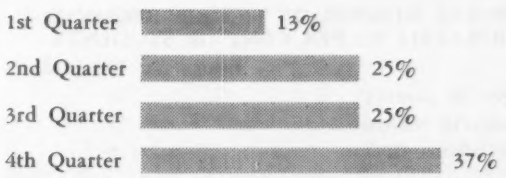
Secondly, we see that grades deteriorate after acquisition of the car and importantly, it is seen that even with *no job* the grades suffer, thus we are left with the result that the car—not the job—is the culprit.

Where the study touched on driver education, the results would seem to upset the assumption that those most likely to be attracted to driver training would be the brighter students with mature attitudes toward safety. The Niles Township survey revealed that driver education classes were made up to a large extent of those students in the bottom quarter of scholastic standings.

19% OF THE STUDENTS HAVE TAKEN HIGH SCHOOL DRIVER TRAINING COURSES

Girls—26% took courses
Boys—13% took courses

Girls were evenly distributed through all 4 quarters
But, the boys rankings were:



Quartile rankings above refer to the academic standing in their class from highest to lowest by quarter.

Trained drivers have better records

These lower scholastic standings, however, were not reflected in the behind-the-wheel performance of driver education students. As a group, they had less than half the accidents and violations of untrained students.

Of the 72 per cent of the student body which had learned to drive, 19 per cent were taught in the high school driver training classes. The others were instructed by parents, relatives or friends. The high school trained driver had only 27 accidents per hundred students as compared to 41 accidents per 100 students who learned to drive in other ways.

ACCIDENT HISTORY RELATED TO HOW STUDENTS LEARNED TO DRIVE

How they learned	% of students having accidents
Taught by brother or sister	33%
Other adult	33%
Parents	30%
Commercial course	27%
High School Driving Course	23%

How they learned	Number of accidents per 100 students taught
Other adult	47
Parents	40
Brother or sister	39
Commercial course	37
High School Driving Course	27

The first set of figures reflects the *number* of students per 100 with accident involvement. The second set reflects the cumulation of accidents per 100 students, thus 23 high school trained drivers per 100 trained were involved and they totaled 27 accidents per 100 trained.

Only 8 out of 100 high school trained drivers collected traffic violation tickets of the students who took part in the survey, while 25 out of 100 parent-trained students received tickets.

TRAFFIC TICKETS RECEIVED BY STUDENTS RELATED TO HOW THEY LEARNED TO DRIVE

How they learned	% of students getting tickets
Taught by parents	24%
Commercial Course	21%
High School Course	8%

TOTAL NUMBER OF TICKETS RECEIVED RELATED TO PER CENT OF STUDENTS

	tickets per 100 students
Taught by parents	38
Commercial Course	31
High School Course	10

Driver education effective

The better driving records of the high school trained students offer a tribute to the effectiveness of the high school driver education classes. Although driving classes are largely made up of students whose grades were in the lower quarter of their classes, these students nevertheless have a fine record on the streets and highways, where responsibility is essential. Thus, we must conclude that *high school driver education courses not only teach the techniques of safe driving, but develop a sense of responsibility in those students most in need of it.*

The Niles Township survey is only the first of a series of surveys that the Allstate research group is conducting throughout the country. Before the program is finished, similar surveys will be made of more than 25,000 students, in approximately 35 high schools throughout the United States and Canada. The researchers hope, through this countrywide study, to develop a composite picture of the high school driver and the total effects of the automobile upon teenage students.

Meanwhile, we can draw certain general conclusions based on the results of the Niles Township study. First of all, this survey reveals that varying degrees of parental indulgence in regard to teenage use of the family car and student car ownership are reflected directly in student's school work. Of the 1455 students questioned in the survey, 72 per cent had learned to drive. Of these, 76 per cent drove their parents' cars. These drivers made up the majority of the lower quarter of their class.

With apparent parental consent, these students had use of family cars for social purposes during periods ranging from one evening a week to seven evenings a week. In addition, many drove to and from school and used cars to drive to and from the part-time jobs they held in order to support their driving activities. When the time spent in driving for social purposes is added to time spent working at part-time jobs to support these driving activities, it is obvious that there is little or no time left for study or homework.

Parental indulgence

Since use or ownership of a car by high school students is subject to parental consent, we can conclude that *the general decline in scholastic standings of teenage drivers can be attributed directly to parental indulgence.* Although, at this time, the survey made no attempt to probe the social pressures resulting in this lack of parental control, it nevertheless appears that this lack is a key factor in the scholastic records of high school students.

On this question of control, the students exhibited remarkable unanimity in opposing adult control of their driving activities when they answered the survey question about the desirability of controlling automobile speeds by means of mechanical governors installed for use when the cars were driven by teenagers. Almost to a man, the students expressed opposition to this form of adult control of their driving. The opposition was vehemently, often bitterly expressed.

The Niles Township survey showed that driver education classes were composed mainly of those students who were at the lower quarter of their classes academically. Yet, their driving records after completing driver education courses indicated that they had not only acquired a sense of responsibility behind the wheel, but were demonstrating it in a practical manner.

Further studies of other schools to be surveyed by Allstate will provide added information on the effect of cars on high school students' school records. When the survey is completed, it is expected to be the most comprehensive exploration of these relationships yet conducted.

SUMMARY

Cars

- Car owners heavily loaded in lowest quarter of class and they ranked low scholastically before getting a car.
- Degree of parental control can be measured by how much the car is used.
- Use of a car has serious adverse affect on grades—provided student is already doing well in school.
- Car ownership leads to part-time jobs.

Jobs

- Better students have week-end jobs only.
- Week-day jobs adversely influence grades.
- The more hours spent on jobs the greater the adverse influence.

Driver Training

- High school trained drivers have fewer tickets and accidents than do students who learned through other sources.
- The boys who take High School course heavily weighted in bottom quarter of class.

DRIVING EXPOSURE:

What Does It Mean? How Is It Measured?

by Roger G. Stewart

The concept of driving exposure has been recognized as a factor in the interpretation of research findings in the broad field of traffic safety. Statistics and studies which mention driving exposure usually refer to some gross measure of driving experience such as total mileage driven per year. For example, established authorities such as the National Safety Council[3] obtain large volumes of statistical data each year which suggest various trends in the frequency and severity of accidents in terms of gross mileage estimates. While the importance of these efforts is not questioned, it is questioned whether this kind of information can be useful in our understanding of the occurrence of accidents on an individual basis.

Some current uses of total mileage per year raise questions on the basic meaning of a concept of driving exposure and, in fact, the suitability of the term *exposure* for these uses and interpretations. In dictionaries, exposure is defined as follows:

"State of being exposed, or laid open or bare; openness to danger; accessibility to anything that may affect, especially detrimentally."

Thus, exposure means essentially being open to danger or to especially detrimental effects of outside stimuli. In traffic safety, we speak of *exposure to accident hazards* and *exposure to accidents*, rather than of specific outside stimuli which may affect our driving safety in a detrimental manner. Our current use of total mileage as a measure of exposure is based on the following three assumptions:

(a) All driving involves some exposure to accident hazards.

(b) This exposure to accident hazards is always proportional to miles driven.

(c) The degree of this exposure associated with miles driven is the same for all drivers.

Have we been operating on these assumptions without some critical examination of their meanings? Perhaps assumption (a) may be accepted as an axiom of life, for proof or disproof is virtually impossible. This assumption, expressed in popular language, simply suggests that one may become involved in an accident at any time while driving. In the field of medicine, the concept of exposure has a more restricted meaning, one which takes account of probable facts in one's present and/or immediate past environment. It is said that an individual has been exposed to a disease after he has had direct contact with some carriers of the disease or has had opportunity for direct contact with the carriers. Some form of exposure precedes, whether by a few minutes or several days, the actual onset of symptoms. In traffic situations, when is any driver being exposed to accident hazards? During every second of his driving experience? Or only during his experiences of immediate contact with potentially hazardous stimuli or conditions?

Concerning assumption (b), one may question whether this exposure to potentially hazardous stimuli has a direct relation to total mileage. For example, it is obvious that certain driving conditions associated with characteristics of traffic, time of day or night, weather, and personal behavior tendencies can greatly influence the total accident hazard of driving. It is known that the number of motor vehicle accidents occurring during hours of darkness is much greater than the number occurring during daylight hours. Since total mileage during daylight hours is much greater than during night hours, this means that total mileage as a measure of exposure to accident hazards would, in itself, suggest a highly different outcome.

Concerning assumption (c), one may question whether the degree of this exposure associated with miles driven is the same for all individual drivers, *even under equivalent driving conditions.* Exposure to accident hazards may be essentially *dynamic* rather than *static*, that is, essentially a function of the continual interaction of one's driving behavior with his ever-changing environment, rather than some stable characteristic of gross vehicle mileage for all drivers under all driving conditions. References to this dynamic character of exposure to accident hazards might be related to some motor vehicle accidents for which there were no obvious contributing physical causes. This dynamic character of exposure also emphasizes numerous differences among individual drivers in their ability and willingness to follow the basic principles of safe driving under all conditions and experiences.

Driving exposure, however defined and measured, would seem to require the following information: (a) How much total driving experience has been obtained during a specified period of time? (b) Which kinds of experience have been obtained during this period? and (c) How much of this total experience has been represented by each kind?

This paper describes a method which yields estimates of mileage for these three kinds of information. This method could be applied to mileage information derived from various sources. In the present instance, the method was applied to inventory responses obtained from a total sample of 178 university students. From the original responses to questions on driving experience, indices of driving exposure were derived and converted into mileage estimates for a few designated driving conditions. These indices were analyzed in relation to records of speeding citations, total traffic citations, and accidents for two years of driving in California.

METHOD

The subjects were 178 students in psychology classes in the University of California, Los Angeles, during 1955-1956. Most subjects had been driving in California for more than two years. The subjects were fairly evenly divided regarding sex, and the median age was about 21 years.

All subjects completed a driving inventory in which they were requested to estimate their total driving mileage per year. Subjects were also asked to recall their recent driving experience with regard to three factors or conditions of driving exposure: *Time* (Day vs. Night), *Traffic* (Light vs. Heavy), and *Location* (City vs. Country). The subjects were instructed to consider *each* factor, such as Time, equal to 100 points, and to divide the 100 points as accurately as possible between the two phases of each factor.

From these responses, 15 different indices (including total mileage per year) were used for classifying subjects as high vs. low for a specific condition of driving exposure. These indices were obtained as follows:

(a) Total Mileage

The estimate of total mileage per year was used as a gross measure of exposure. The estimates were considered in terms of intervals of 2,500 miles (2,500 miles, 5,000 miles, etc.).

(b) Simple Indices of Driving Exposure

Six simple indices were obtained from the percentage figures reported in the inventory for the two phases of each factor (Day, Night, Light Traffic, etc.). The total mileage figure reported in the inventory was multiplied by each of the six simple percentage figures to yield estimates of exposure in terms of mileage.

(c) Compound Indices of Driving Exposure

Eight compound indices were obtained by multiplication of the percentage figures for each combination of three specific driving conditions (Day × Light Traffic × City, etc.). Within rounding errors, the sum of the eight resulting values per subject equals 1.00, which means that 100 per cent of his driving experience as reported by him was partialed into eight combinations of conditions on a simple percentage basis. These eight values were also converted into estimates of exposure in terms of mileage.

Perhaps the computation of the indices will be more meaningful with the following example:

Total mileage per year = 20,000

A. Time	%	B. Traffic	%	C. Location	%
Day	70	Light	20	City	90
Night	30	Heavy	80	Country	10

In this example, the mileage estimate for daylight driving during the year is 14,000 (.70 × 20,000) miles. The mileage estimate for night driving, thus, is 6,000 (.30 × 20,000) miles. The estimate for the driving experience combination of Day × Light Traffic × City is about 2,500 (.70 × .20 × .90 × 20,000 = 2,520) miles. The estimate for the combination of Night × Light Traffic × City, therefore, is 1,080 miles. Using this procedure, the set of 2,492 (14 × 178) simple and compound exposure indices was obtained for comparisons with traffic records.

Determining Records of Traffic Behavior

After the testing, the officials records of traffic citations and accidents for all subjects while driving in California were obtained from the Department of Motor Vehicles in Sacramento, California. The total sample of 178 subjects does not include 14 individuals whose inventory responses were incomplete or otherwise unusable. Using the official records, the subjects were classified (none vs. one or more) with regard to speeding citations, total traffic citations (including speeding citations), and accidents. Of the 178 subjects, 54 had received a speeding citation and 99 (including the 54) had received one or more citations for a moving traffic offense. Thirty-eight of the 178 subjects had been involved in one or more accidents.

Controlling for Sex

Like the recent study of Boek[1] in New York, it was found necessary to control for sex differences with regard to criteria of this kind. Of the 178 subjects, inventory records indicated totals of 126 men and 50 women (two records failed to indicate sex). The two sex groups were compared in terms of speeding citations, total citations, and accidents. In each instance, the value of chi-square was significant at the .01 level of probability with a higher percentage of the men having been involved in citations and accidents than women. When the total sample was divided into two groups based on total mileage, the three chi-squares indicated that it was not necessary to control for total mileage. Since the group of 50 women was considered to be too small for research purposes, all further results given in this paper will pertain to the group of 126 men.

In terms of each criterion, the two subgroups of the male subjects were compared in total mileage and in the 14 simple and compound indices of driving exposure. Using chi-square, the null hypothesis of no dependence was tested in all these instances (3 × 15 = 45). All chi-squares were computed from fourfold tables using a median grouping of the mileage distribution for each index of exposure.

RESULTS

Total Mileage

Using the estimate of total mileage per year, the three chi-squares failed to be significant at the .05 level of probability, being the following: Speeding Citations (X^2 = .09), Total Citations (X^2 = 2.65), Accidents (X^2 = .87). Thus, these results fail to show, for example, that subjects with one or more traffic citations reported significantly higher (or lower) total mileages per year than the subjects with no citations. For these subjects, increased driving exposure in total mileage per year was not associated with receiving traffic citations.

The possibility was explored that the simple median

grouping of the total mileage distribution obscured an actual trend of differences within one or more of the criterion groupings. However, some examination of each total mileage distribution failed to reveal any evidence of any trend toward greater mileages for subjects with records of the citations or accidents.

Simple Indices of Driving Exposure

Using the six simple indices of driving exposure, none of the 18 values of chi-square was significant at the .05 level of probability. These results are shown in Table 1.

Table 1

Chi-Squares for Simple Indices of Driving Exposure

Index	Speeding Citations	Total Citations	Accidents
Day	1.96	1.69	.36
Night	1.57	.12	.52
Light Traffic	.05	.18	1.26
Heavy Traffic	.03	2.34	.00
City	.30	.59	1.45
Country	.00	1.59	.46

Table 1 shows that most of the 18 chi-squares were clearly negligible. In addition, the higher values fail to suggest any tentative pattern of exposure influences which might yield some significant findings in further research.

Compound Indices of Driving Exposure

Using the eight compound indices of driving exposure, only 1 of the 24 values of chi-square was significant at the .05 level of probability. These results are shown in Table 2.

Table 2

Chi-Squares for Compound Indices of Driving Exposure

Index	Speeding Citations	Total Citations	Accidents
Day × Light Traffic × City	.11	.01	.01
Day × Light Traffic × Country	.03	.15	1.45
Day × Heavy Traffic × City	1.34	2.71	.27
Day × Heavy Traffic × Country	.11	4.11*	.08
Night × Light Traffic × City	.03	1.32	1.45
Night × Light Traffic × Country	.02	.29	.06
Night × Heavy Traffic × City	.16	.01	.85
Night × Heavy Traffic × Country	.85	1.32	.16

*Significant at the .05 level.

Table 2 shows that most of the 24 chi-squares were also negligible. The one significant chi-square of 4.11, which was based on the compound index of Day × Heavy Traffic × Country, barely exceeded the required value of 3.84, for the .05 level of probability. By reference to the chi squares for total citations shown in Table 1, we find that the three highest chi-squares were obtained for the simple indices of these three conditions. Other than this, the results shown in Table 2 suggest no specific pattern of variations in driving exposure for the three criterion groups.

DISCUSSION AND SUMMARY

Our results failed to indicate significant differences between subjects classified with respect to speeding citations, total traffic citations, and accidents in terms of total mileage per year and the 14 derived indices of driving exposure. For these subjects, the variations in driving exposure seemed to be independent of their records of citations and accidents. In other words, the subjects of this study with records of citations or accidents failed to report significantly higher mileage figures, based on the indices of driving exposure, than other subjects.

Our results may be compared with those of Boek[1] in three respects. First, her subjects, obtained from a random selection of households in a large city rather than from university classrooms, were probably less homogeneous than our subjects in terms of age level, education level, economic level, and social status. Would one or more of these factors be correlated significantly with total mileage or with traffic citation or accident experience? For her sample, Boek found that total mileage and sex were associated with accident status, but no mention is made of other factors. When she controlled her analysis for total mileage and sex differences, she found very few significant differences in accident status for categories of personal and social variables.

Though the results of Boek were based in part on personal daily mileage reports, these two studies of driving exposure yielded similar findings. During each week for four weeks, her subjects were asked to keep a daily record of miles driven. She also obtained a measure of total mileage for a recent period of two and one-half years. In future studies, information on any phase of driving exposure, however obtained, should perhaps be supplemented with some detailed descriptions of driving experiences under various driving conditions which one might evaluate in terms of potential danger.

Third, while Boek found that total mileage was associated with accident status in her sample, our findings failed to support this. Perhaps this outcome may be explained by reference to much greater total mileages of some of her subjects compared with ours, or to an interaction of some personal and social factors with total mileage.

In conclusion, future studies of individual driving exposure may consider this concept in relation to certain personal and social variables as they may interact with mileage. Our results and those of Boek indicate that personal reports of total mileage fail to have substantial correlations with experiences of traffic citations and accidents. These results may compel us to believe that total mileage for any time interval may be inadequate and unrealistic as a common unit of exposure to hazards for all individuals who drive automobiles.

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The Effects Of Driver Education On Driver Knowledge and Attitudes In Selected Public Secondary Schools

By Bernard I. Loft

The purpose of this study was to consider the effects of a driver education course on driving knowledge and attitudes of high school seniors. Essentially, the investigator endeavored to discover differences in driving knowledge and attitudes between students who completed a driver education course and students without training in driver education. A further analysis was concerned with determining the differences between the two groups with regard to traffic accidents and violations in which the students had been involved.

The 14 high schools participating in the investigation were selected from the high schools in Indianapolis and Marion County, Ind. They were selected on the basis of their offering a two-part program consisting of classroom and behind-the-wheel instruction. Prior to contacting the schools, approval was obtained from the superintendent of schools in both Indianapolis and Marion County. Personal contact was then made with the principal of each school to explore the possibilities of conducting a student paper pencil testing program and a personal interview with the driver educators.

To determine the status of the driver education program at each sample school, a personal interview was conducted with faculty members responsible for both classroom and behind-the-wheel instruction. The interview consisted of obtaining information based on the standards established by the National Commission on Safety Education of the National Education Association. Each of the standards was duplicated in the form of a check list, and responses were recorded by the investigator at the time of the interview. The collected data were then placed on a master chart for further analysis. The interview was of considerable value in determining the various administrative and organizational patterns established at the sample schools for a two-part program in driver education.

Selection of the two testing instruments was determined by reason of their adaptability to the trained and untrained student drivers. The Siebrecht Attitude Scale was used to measure driver attitudes considered to be significant in the efficient driving of an automobile. The 40 statements in the attitude scale include: passing situations on curves and hills, the privilege of driving, traffic regulation, enforcement, condition of the vehicle, accident responsibility, speeding, cooperation, license examination for drivers, courtesy and consideration, condition of the driver, knowledge, and skills.

The American Automobile Association's General Test on Traffic and Driving Knowledge was used to determine the students' understanding of traffic and driving problems. This test consisted of 25 multiple response questions with emphasis on those elements of traffic safety that should be familiar to all drivers.

The two tests were administered to those students classified as seniors and who were present and available at the time the tests were given. A total of 2,442 senior students took the two tests. In addition, a personal data sheet was completed by each student giving sex, age, frequency of driving, and other pertinent information.

In administering the tests the investigator adhered to standardized procedures at each of the schools. Initially, all the students were informed of the purpose of the study and the value of their personal contribution. Following this procedure, the directions were then discussed concerning the students' responsibility in completing the Siebrecht Attitude Scale. Upon concluding this phase of the testing program, an explanation of the General Test on Traffic and Driving Knowledge was presented in detail. The investigator placed particular emphasis upon the necessity of all students to put forth their best efforts.

In the final analysis, only those students possessing a valid driver's license were included in the study. Of the 2,442 who completed the two tests, 1,607 were in possession of a valid driver's license and were the subjects for the study.

Through an investigation of the records of the 1,607 students on file with the Indiana Bureau of Motor Vehicles, data were obtained relative to the number of automobile accidents and traffic violations. This information, along with the results of the General Test on Traffic and Driving Knowledge and Siebrecht Attitude Scale, was then prepared for transfer to IBM punch cards.

Two IBM punch cards were prepared for each student. A total of 4,884 punch cards was prepared, representing two cards for each student who completed the two tests. The final sample was reduced to 3,214 cards for a total of 1,607 students having a valid driver's license. Male students were represented by a total of 491 cases with driver education and 316 untrained male students. The female students consisted of 560 who completed a driver education course and 240 classified as non driver education.

Mean scores and standard deviations were computed for the General Test of Traffic and Driving Knowledge and the Siebrecht Attitude Scale for each of the following categories:

Boys

- Driver education
- Non driver education
- Both combined

Girls

- Driver education
- Non driver education
- Both combined

Boys and girls

- Driver education
- Non driver education
- Both combined

Using Critical Ratio as a statistical measure, differences between the means on the General Test on Traffic and Driving Knowledge and the Siebrecht Attitude Scale were analyzed at the 5 per cent level of confidence to determine if the populations of students displayed similarities or differences.

The variable factors were then compared in all possible combinations for related or unrelated tendencies by using the Chi-Square technique at the 5 per cent level of confidence. A total of 40 Chi-Square values was computed for boys and girls classified as driver education and non driver education in the following comparisons:

1. Frequency of driving and driving knowledge test scores
2. Frequency of driving and attitude scale scores
3. Frequency of driving and traffic violations
4. Frequency of driving and traffic accidents
5. Knowledge test scores and number of traffic violations
6. Knowledge test scores and attitude scale scores
7. Knowledge test scores and number of traffic accidents
8. Attitude scale scores and number of traffic violations
9. Attitude scale scores and number of traffic accidents
10. Number of traffic violations and number of traffic accidents

Frequency of responses by percentages on the Siebrecht Attitude Scale was included in the study for making comparisons between the driver education and non driver education students in terms of attitudes.

FINDINGS

On the basis of this study the investigator makes the following findings:

1. Nine of the 14 schools scheduled driver education on the same basis as other subjects in the high school curriculum.

2. All the participating schools included classroom and behind-the-wheel instruction for students ranging in age from 15½ to 16 years.

3. Academic credit ranging from one-sixth to one credit was awarded upon satisfactory completion of the course in 11 schools.

4. With one exception, driver education instructors in the schools were certified in secondary education.

5. One or more instructors in each of the 14 schools completed professional preparation in driver education.

6. Classroom instruction ranged from 15 to 45 hours, with only four schools offering the recommended standard of 30 hours or more.

7. Behind-the-wheel instruction in the 14 schools ranged from 2 to 10 hours, with four schools offering 8 to 10 hours of supervised road instruction.

8. Classroom instruction was established as a separate course for one semester in 10 of the schools.

9. Classroom enrollment at eight schools was comparable to the other academic areas.

10. Behind-the-wheel instruction consisting of one period per week for a full semester was the practice at 10 schools.

11. All the schools used a driver education textbook and supplementary classroom study materials.

12. Dual control cars were obtained by the 14 schools on a loan agreement with local dealers.

13. A testing procedure for evaluating student progress was used in varying degrees in the 14 schools.

14. The mean score for 560 driver education girls on the knowledge test was 79.10 with a standard deviation of 12.64.

15. The mean score for 560 driver education girls on the attitude scale was 161.15 with a standard deviation of 14.86.

16. The mean score for 240 non driver education girls on the knowledge test was 77.00 with a standard deviation of 12.24.

17. The mean score for 240 non driver education girls on the attitude scale was 159.77 with a standard deviation of 16.67.

18. A comparison of the 560 trained and 240 untrained girls on the knowledge test and attitude scale produced differences in means of 2.10 and 1.38 respectively, in favor of the driver education girls.

19. Driver education boys, numbering 491, had a mean score of 77.55 and a standard deviation of 11.45 on the knowledge test.

20. The mean score for 316 non driver education boys on the knowledge test was 76.70 with a standard deviation of 16.43.

21. Driver education boys, numbering 491, had a mean score of 154.94 with a standard deviation of 18.38 on the attitude scale.

22. The mean score for 316 non driver education boys on the attitude scale was 154.07 with a standard deviation of 16.79.

23. A comparison of 491 trained and 316 untrained boys on the knowledge test and attitude scale yielded differences in the mean scores of .85 and .87 respectively.

24. Trained and untrained girls combined were superior on the knowledge test when compared with the driver education and non driver education boys. There was a mean score of 78.42 and a standard deviation of 12.56 for the girls in contrast to a mean score of 77.22 and a standard deviation of 13.63 for the boys.

25. A comparison of the non driver education boys and non driver education girls yielded a critical ratio of .2463. Thus, there was little difference between the groups on mean scores for the knowledge test.

26. A comparison of the means on the knowledge test scores for driver education and non driver education girls favored the trained girls with a critical ratio of 2.1981 at the 5 per cent level of confidence.

27. At the 5 per cent level of confidence, an obtained critical ratio of 2.2470 for the difference between the means indicated the superior driving knowledge of driver education girls as compared to non driver education boys.

28. Driver education girls were superior in knowledge when compared with the driver education boys. This is revealed by a critical ratio of 2.0830 for the difference between the means on the knowledge test at the 5 per cent level of confidence.

29. The difference between the means on the attitude scale for the boys and girls with driver education and the untrained boys and girls yielded a critical ratio of 6.1123, indicating better driving attitudes for those who completed a driver education course.

30. There was no appreciable difference in the means of the attitude scale scores of driver education and non driver education girls. A critical ratio of 1.9303 was just slightly in favor of the trained girls.

31. The driver education girls had significantly better attitudes toward driving than the driver education boys. The difference between the means on the attitude scale yielded a critical ratio of 5.9654 at the 5 per cent level of confidence.

32. The driving attitudes of non driver education girls were significantly more desirable than those of non driver education boys as was reflected by a critical ratio of 5.6716 at the 5 per cent level for the differences in the means of the two groups.

33. A critical ratio of 4.0596 indicated that non driver education girls disclosed better attitudes toward driving in comparison with the combined group of non driver education boys and girls.

34. Driver education and non driver education girls with high driving frequencies scored high on the attitude scale.

35. Driver education girls with high driving frequencies were involved in the fewest traffic violations.

36. Non driver education girls having high driving frequencies were involved more frequently in traffic violations.

37. Driver education and non driver education girls with high driving frequencies were involved in the fewest traffic accidents.

38. Driver education and non driver education girls with high scores on the driving knowledge test were charged with the fewest traffic violations.

39. Non driver education girls with high scores on the driving knowledge test also produced similar scores on the attitude scale.

40. Driver education and non driver education girls with high driving knowledge test scores were involved in the least traffic accidents.

41. Non driver education girls having scored high on the attitude scale were involved in a smaller number of traffic violations.

42. Untrained girls with several traffic violations were also found to have the higher number of traffic accidents.

43. Driver education and non driver education boys with high driving frequencies were involved in the fewest traffic accidents.

44. Driver education and non driver education boys with high driving frequencies scored favorably on the driving knowledge test.

45. Non driver education boys with high driving frequencies were involved in the least traffic violations.

46. Driver education and non driver education boys with desirable scores on the driving knowledge test were involved in the least traffic violations.

47. The relationship between attitude scale scores and traffic violations revealed that the non driver education boys with high attitude scale scores were involved in a relatively small number of traffic violations.

48. Driver education and non driver education boys having scored high on the attitude scale had only a few involvements in traffic accidents.

49. The frequency of responses for 1,607 driver education and non driver education boys and girls on the Siebrecht Attitude Scale revealed that boys and girls with training in a two-part driver education course consistently responded in conformity with the established responses.

CONCLUSIONS

On the basis of this study the author makes the following conclusions:

1. Boys and girls having completed a two-part course in driver education possess desirable attitudes toward driving and adequate traffic and driving knowledge.

2. Driver education is particularly advantageous to girls in their acquisition of traffic and driving knowledge.

3. Boys and girls without training in driver education have a similar understanding of traffic and driving knowledge.

4. Attitudes related to driving responsibility are not materially affected by a driver education course for girls.

5. Girls without training in driver education have established a relatively safe driving record.

6. Driver education courses should consist of specific learning experiences for boys so that attitudes and adequate knowledge will be a realistic outcome of such a course.

7. Driver education is influential in reducing accidents and traffic violations for teen-age drivers.

8. Students in driver education should be required to take a screening test at the beginning of the course as a means of determining their needs.

RECOMMENDATIONS

Based on the findings, the investigator recommends that:

1. The administrator and a faculty committee periodically evaluate the driver education program to ascertain the quality of instruction in all phases of the program.

2. The evaluation of the driver education program be based on the objectives listed by the National Commission on Safety Education of the National Education Association.

3. Driver education instructors place more emphasis on the development of desirable attitudes through both the classroom and behind-the-wheel instruction.

4. High school students possessing a driver's license but who have not completed a driver education course be encouraged to enroll in such a course.

5. Greater emphasis be placed on proper reactions when confronted with an emergency driving situation.

6. Additional behind-the-wheel instruction periods be scheduled for the boys.

7. Instructors of driver education refer to this study for information concerning factors considered to be important in efficient automobile driving.

8. The findings in this investigation be used by the sample schools in Indianapolis and Marion County as a partial evaluation of their driver education programs.

9. School administrators and driver education instructors in Indiana familiarize themselves with these findings prior to a revision of their driver education programs.

10. The results of this investigation be compared with the reports of the American Automobile Association in Chapter I concerning the effectiveness of driver education in various locations throughout the United States.

11. The findings of this study be used in teacher preparation courses to familiarize prospective driver education instructors concerning the significance of traffic and driving knowledge and desirable attitudes as related to driving frequency, traffic violations, and traffic accidents.

12. The State Department of Public Instruction consider a follow-up study with a state-wide survey to determine the effectiveness of driver education for the state of Indiana.

13. A study to be made to evaluate the quality of instruction as related to the number of hours of classroom and behind-the-wheel instruction.

14. A study be made to determine if driver education courses should have any different content and/or methodology for girls and/or boys.

15. A study be conducted to provide data as to course content and procedures for high school students who have previously mastered some of the driving fundamentals.

16. A study be made to show how driver education courses may be organized and presented to provide adequate attention to developing desirable attitudes.

17. The findings in this study along with further research be directed at determining the extent to which responses on attitude tests are reflected in actual driving practices.

18. A study be made to determine the extent to which undesirable attitudes may be the direct cause of automobile accidents.

19. A standardized knowledge test be constructed which would be consistent with the standards established by the National Commission on Safety Education of the National Education Association.

20. A study be made to determine the special problems of teen-age drivers as indicated by traffic violations and accidents.

21. A study be made to determine the effectiveness of driver education by means of a pre-test and post-test of driving attitudes and driving knowledge.

Dr. Loft in this study prepared 42 tables presenting all of his raw data. Space does not permit the publication of these tables, but readers wishing copies can obtain them by writing to the Research Division of the National Safety Council.

Two Simple Techniques For Determining The Significance Of Accident-Reducing Measures

by Richard M. Michaels

Whenever an attempt is made to reduce accidents on a section of highway through modification of some of the accident-producing features, the question arises as to whether an observed reduction is due to anything more than chance alone. The most common approach to evaluation has been to institute improvements on sections of highways where a large number of accidents have occurred. Then after modification, reductions in accidents are reported as a percentage relationship of the before and after experience. At this point it must be determined whether the observed percentage reduction is great enough to be ascribed to the change introduced or whether it is due to chance factors. An attempt is made in this article to describe two simple relations that are available for determining the significance of a percentage reduction in accidents.

Accident Study Requirements

In order to make a comparison on a before-and-after basis, one must be certain that the two study periods are reasonably comparable. The following factors must be considered in the evaluation: (1) Some measure of vehicle-miles is needed for both the before and after periods in order to equate accident exposure; (2) the traffic volumes for each of the two periods should be approximately the same, for marked differences in volumes will affect the accident experience;[1] (3) the composition of the traffic on the study section should be unchanged during each of the two periods as this, too, may influence accident experience; and (4) since the fatal accident rate has consistently tended to decrease over the years, the accident totals in the after period should be corrected for any existing trends.

The accident figure used for analysis should be the total number of accidents by type, either fatality, injury, or property damage. The total number of fatalities or the total number of injuries should not be used whenever the number of accidents is less than 50.[2] The restriction in considering accidents by type reflects the fact that the number of deaths or injuries will usually be determined by factors peculiar to the individual accident. Thus, the number of occupants of the vehicle, its speed, or the geometry of collision may be the variables that determine the number of casualties. These are usually independent of the highway and any modification made thereon. Therefore, analyzing the frequency of accidents by type should yield a more precise measure of the effects of highway modifications.

Application of Poisson Distribution

Accidents are rare events in time, distance, or among individuals. For example, the probability of a fatal accident is only about 5 chances in 100 million miles of driving. The same low probability exists whether the reference is thousands of vehicles or frequencies of accidents among a group of people. An applicable statistical model is the Poisson distribution which is an approximation to the binomial density function when the probability of the event is low and the population in which it occurs is large.

In general, the assumptions of the Poisson distribution are met in most accident situations. Several studies have shown that this model fits traffic accident data very well.[3] Therefore, one way to approach the problem of determining the significance of a percentage reduction in accidents is to assume that the observed data are a sample from a Poisson distribution.

If the before time period accident frequency is used as the expected value of the Poisson distribution, then it is possible to determine the percentage decrease in accidents that is statistically significant. Given the number of accidents before modification, the solution of the Poisson distribution leads to curve 1 which is illustrated in figure 1. The curve shows the percentage reduction in accidents that can be attributed to something more than chance. To illustrate the application of figure 1, assume that 40 accidents occurred on a given section of highway before modification. Reading from the graph (curve 1), it is observed that a 26 per cent reduction in the number of accidents would indicate a significant change at a 5 per cent probability level. Thus, a reduction in accidents due to chance would occur only once in 20.

Curve 1 is a liberal estimate of significance, and it must be interpreted carefully. The number of accidents in the before time period is assumed to be the true mean of the Poisson distribution. Since the number of accidents varies from year to year, taking any one year as the expected value of the population is arbitrary. Consequently this estimate of the mean may be in considerable error. It is especially suspect when the number of accidents in the before time period is abnormally high or low. Averaging over several comparable years is probably the best compromise. Within this limitation the test requires the smallest percentage reduction for obtaining statistical significance.

Application of Chi-Square Test

In order to make a more conservative estimate, an alternative is the chi-square test. By using this test it is possible to determine whether the two samples differ significantly; that is, whether the number of accidents occurring after corrective measures are instituted is reliably less than the number before. Curve 2 in figure 1 shows the percentage reduction in accidents that is significant as a function of the number of accidents occurring before improvements are made. The test assumes that the highway sections remain the same or can be adequately corrected from year to year.

The two curves represent two limits which can be applied to determine whether there is a reliable reduction in acci-

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[1] *The Interstate Highway Accident Study*, by Morton S. Raff. PUBLIC ROADS, vol. 27, No. 8, June 1953; also Highway Research Board Bulletin 74, 1955, pp. 18-45.

[2] Although the selection of a sample size of 50 is arbitrary, it should generally minimize any bias that might be imposed by the rare accident in which a large number of fatalities or injuries occurred. The probability of more than five deaths or injuries occurring in a single accident is very low. Consequently, with a sample size of 50 or more, these single cases will inflate the accident frequency rarely more than 10 percent.

[3] *Poisson and Traffic*, by Daniel L. Gerlough and André Schuhl. Eno Foundation for Highway Traffic Control, Saugatuck, Conn., 1955, 75 pp.

dents. Curve 1 may be used to minimize the chance of calling a reduction not significant when in fact it is, and curve 2 may be used to minimize the chance of calling a reduction significant when it is not. In general, curve 2 should be used where there is limited before data. If accident data for several years before modification are available, and show a variation of no more than 20 per cent from year to year, they may be averaged. Then the after time period may be compared with this average and curve 1 used to determine whether the reduction is statistically significant.

Testing for Significance

In order to demonstrate the use of the curves, four examples from two studies have been selected. In one study, the effect of traffic control devices on accidents at different types of intersections was investigated.[4] It was found that prior to installation of flashing beacons at five- and six-leg intersections, 19 accidents were recorded. After installation of flashing beacons, the number of accidents decreased 37 per cent. Figure 1, curve 1, shows that for this size sample, it is reasonable to conclude that the flashing device did not significantly reduce accidents and the reduction could have been due to chance alone.

At four-leg intersections on divided highways, it was found that after installation of flashing beacons the number of accidents were reduced from 50 to 35, or 30 per cent. Reference to figure 1 shows that for a before value of 50 accidents, a 30 per cent reduction is significant according to the liberal test, but it is not according to the conservative test. Since only 1 year of before data is available, the conservative test is preferred. Therefore, it is reasonable to conclude that the flashing device did not significantly reduce accidents at these intersections.

One of the remaining two examples of accident experience, selected from a second study,[5] indicated a significant reduction in accidents according to the liberal test, whereas the other example met the requirements of both tests.

At an intersection of a four-lane divided highway and a two-lane highway, there was an average of 27 accidents over a 2-year period. Most of these accidents were due to left-turn movements from the major to the minor highway. In an attempt to reduce accidents, a left-turn lane was added to the major highway and a left-turn arrow was added to the traffic signal. After these modifications there were 16 accidents per year, or a 41 per cent reduction. Figure 1 shows that this is a significant reduction using the liberal test but not using the conservative test. Since the data are averages for 2 comparable years, the liberal test is the logical one to use. On this basis it is reasonable to conclude that the traffic engineering measures significantly reduced accidents at this intersection.

At one point on a four-lane divided highway, drivers had to negotiate a sharp curve. Over a 3-year period there was an average of 17 accidents per year. In an attempt to reduce accidents, highway lighting was added and also road-edge delineators. After the changes, there were 5 accidents per year, or a 70 per cent reduction. With reference to figure 1, such a reduction is statistically significant by both tests. Therefore, it is reasonable to conclude that the engineering changes did cause a statistically reliable reduction in accidents.

Statistical Limitations

A word of caution is in order concerning the use of the curves. Both tests require fulfillment of certain statistical assumptions to be wholly valid. There is no way to prove that these assumptions are met in any given field situation. Accident processes are not constant in time, and the factors influencing their change are poorly understood at best. Furthermore, there is never good control over all the variables influencing changes in accident incidence. Populations of drivers change, as do populations of vehicles. In addition, several accident reduction measures are always operating, e.g., enforcement and education. It is therefore rarely possible to eliminate the influence of all such forces and ascribe an observed reduction unequivocally to some single specific measure.

The curves shown may be used as an estimate of the percentage reduction in accidents that is required to achieve statistical significance. In using these curves the limitations inherent in any field study should be recognized. Where techniques or measures do appear to show a significant influence on accident incidence, a more intensive evaluation of them may be required. This can and should be done with emphasis given to careful control and more precise measurements.

[4] *Traffic Signals and Accidents in Michigan*, by David Solomon. PUBLIC ROADS, Oct., 1959.

[5] *Reducing Accidents by Traffic Engineering*. Virginia Department of Highways, Richmond, 1957, 31 pp.

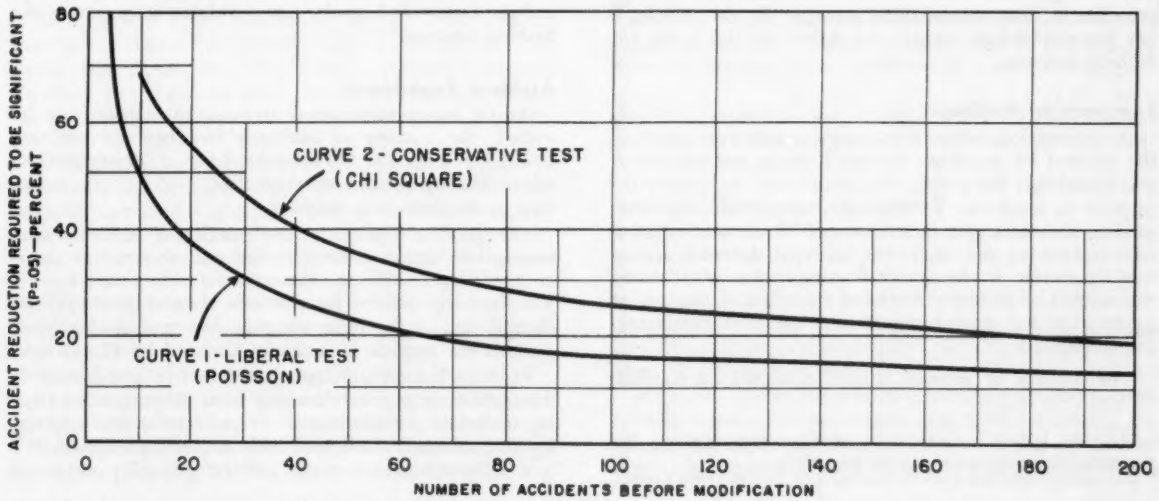

Figure 1—Curves for determining the statistical significance of accident-reducing techniques.

Traffic Signals and Accidents in Michigan

by David Solomon

To the general public, the installation of a traffic signal often implies that accidents will be substantially reduced. Studies have frequently shown, however, that this is not always true. One such study was recently conducted in Michigan[1]. From 1946 to 1957 the Michigan State Highway Department made a detailed accident study at each of 89 intersections where traffic signals were installed. The intersections, distributed throughout the southern half of the State, were located in and near cities as well as on rural highways. Data were collected at each intersection for 1 or 2 years prior to installation of the signals and for an equivalent period afterwards.

The types of intersections included in the study ranged from simple three-leg to five- and six-leg and other complex intersections. As might be expected, more than half of the intersections had four approach legs without medians or islands to separate opposing streams of traffic. The four-leg divided intersections were, in most cases, divided on the main highway only. Of the 89 intersections studied, 39 were signalized with standard stop-and-go controls and 50 with flashing beacons. These beacons flashed yellow on the main street or major highway, and red on the side street or minor highway.

At 38 of the 89 intersections, traffic data were available. The average daily traffic volumes entering from all approaches at these intersections averaged 20,200 vehicles a day for stop-and-go signals and 8,000 vehicles a day for flashing beacons.

Summary of Findings

At intersections where stop-and-go signals were installed, the number of accidents increased nearly one-fourth. It was found that the simpler the intersection, the greater the increase in accidents. For example, simple three-leg intersections showed a gain in accidents of 78 per cent, whereas five- and six-leg and other complex types showed a decline of 47 per cent. In the case of flashing beacon installations, the number of accidents decreased regardless of the type of intersection, the range being 21 to 37 per cent and averaging 26 per cent.

The number of persons injured decreased by one-fifth at intersections where stop-and-go signals were installed and by one-half in the case of flashing beacon installations. The number of fatalities also decreased after either of the two types of signals were installed.

After installation of stop-and-go signals, the number of rear-end, head-on, and side-swipe collisions increased 200, 157, and 74 per cent, respectively. Only angle and miscellaneous types of collisions decreased. The installation of flashing beacons resulted in a nearly uniform reduction of about one-fourth for each type of collision.

In the investigation of the effect of light and weather conditions on the accident rate following stop-and-go signal installation, it was found that the number of accidents during inclement weather increased fourfold as compared with accidents during all-weather conditions. This relation applied to both daytime and nighttime driving. After installation of flashing beacons, daytime accidents during inclement weather as well as during all-weather conditions decreased by one-fifth. On the other hand, nighttime accidents during inclement weather decreased by one-sixth as compared with a decrease of one-third for all-weather conditions.

At 38 intersections where traffic volume data were available, it was found that the greatest reduction in accident rates occurred at the higher volume intersections for stop-and-go signals and at the lower volume intersections for flashing beacons.

Accident Experience

At 39 intersections where stop-and-go signals were installed, the number of accidents increased 23 per cent (table 1 and fig. 1). On the other hand, at 50 intersections where flashing beacons were installed, a 26 per cent reduction in accidents was recorded.

The greatest increase in the number of accidents after stop-and-go signals were installed was observed at three- and four-leg undivided intersections (table 1 and fig. 2). The four-leg divided intersections showed practically no change, and at the more complex five- and six-leg intersections the number of accidents declined by 47 per cent.

Flashing beacon installations resulted in a reduction in the number of accidents ranging from 21 per cent at four-leg undivided intersections to 37 per cent at five- and six-leg intersections. Compared with stop-and-go signals, this is a relatively narrow range and no general pattern was

[1]Acknowledgment is made to the Michigan State Highway Department for furnishing the data for this article.
This article is reprinted from the October, 1959 issue of *Public Roads*.

Table 1.—Number of accidents, injuries, and fatalities before and after traffic signal installation at 89 intersections

Number of intersections	Type of intersection	Number of accidents				Number of injuries				Number of fatalities			
		Before signal installation	After installation of—			Before signal installation	After installation of—			Before signal installation	After installation of—		
			Stop-and-go signal	Flashing beacon	Percentage change		Stop-and-go signal	Flashing beacon	Percentage change		Stop-and-go signal	Flashing beacon	Percentage change[1]
3	3-leg	37	66	..	78	27	26	..	[2]—4	3	0	..	..
13	3-leg	114	..	78	—32	78	..	34	—56	3	..	4	..
23	4-leg, undivided	182	293	..	61	145	174	..	20	7	4	..	[2]—43
29	4-leg, undivided	219	..	174	—21	176	..	94	—47	21	..	6	—71
9	4-leg, divided	158	165	..	[2]4	136	91	..	—33	2	1	..	..
5	4-leg, divided	50	..	35	—30	42	..	16	—62	2	..	2	..
4	5- and 6-leg and other types	85	45	..	—47	70	13	..	—81	2	2	..	..
3	5- and 6-leg and other types	19	..	12	[2]—37	15	..	11	[2]—27	2	..	1	..
39	All types	462	569	..	23	378	304	..	—20	14	7	..	—50
50	All types	402	..	299	—26	311	..	155	—50	28	..	13	—54

[1] Too few data to compute percentage change, except for 4-leg undivided and all types of intersections.
[2] Percentage change is not statistically significant.

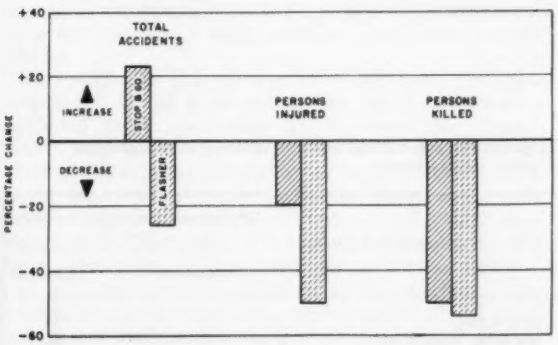

Figure 1—Percentage change in the number of accidents, injuries and fatalities after installation of traffic signals.

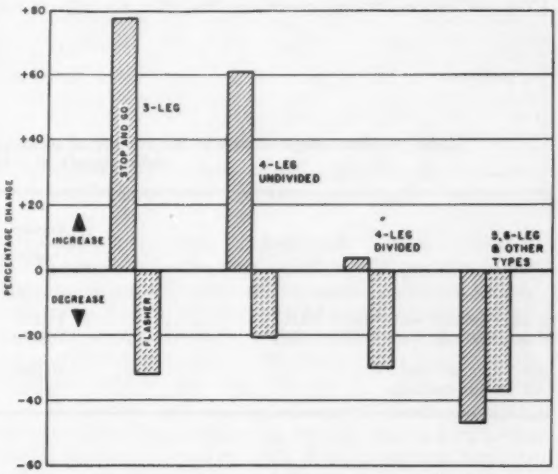

Figure 2—Percentage change in the number of accidents, by type of intersection, after installation of traffic signals.

evident among the four types of intersections.

Both types of signal installations brought about a reduction in the number of persons injured: 20 per cent for stop-and-go signals and 50 per cent for flashing beacons. Fatalities also decreased after installing either type of signal, but no definite conclusions should be drawn from this experience because of the limited sample.

After stop-and-go signals were installed, the number of persons injured remained fairly constant at three-leg intersections; increased slightly at four-leg undivided intersections; decreased moderately at four-leg divided intersections; and decreased substantially at five- and six-leg and other complex types of intersections. This trend was quite similar to that found for the number of accidents. At flashing beacon installations there was a general decrease in the number of persons injured at all types of intersections, but no definite pattern was evident.

The data developed in this study indicate that stop-and-go signals are less effective from the safety standpoint at simple types of intersections, but for the more complex types they may be desirable. It appears that greater consideration should be given to the use of flashing beacons at three- and four-leg intersections where some type of signal is required.

Accident Exposure Considered

Up to this point exposure to accidents at the various intersections has not been considered. At 38 intersections where traffic volume data were collected, it was found that volumes increased 11.1 per cent after installing stop-and-go controls and 11.5 per cent after installing flashing beacons. These percentage increases applied generally to the different types of intersections studied.

Accident, injury, and fatality rates based on 100 million vehicles entering the intersections are shown in table 2. In general, the trends observed in table 2 for the 38 intersections, after considering the rate of exposure to accidents,

Table 2.—Number of accidents, injuries, and fatalities per 100 million vehicles entering before and after traffic signal installations at 38 intersections

Number of intersections	Average daily traffic	Type of intersection	Number of accidents per 100 million vehicles entering intersections				Number of injuries per 100 million vehicles entering intersections				Number of fatalities per 100 million vehicles entering intersections			
			Before signal installation	After installation of—			Before signal installation	After installation of—			Before signal installation	After installation of—		
				Stop-and-go signal	Flashing beacon	Percentage change		Stop-and-go signal	Flashing beacon	Percentage change		Stop-and-go signal	Flashing beacon	Percentage change[1]
2	11,800	3-leg	172	297	..	73	179	116	..	—35	20.7	0	..	..
5	6,700	3-leg	190	..	178	—6	108	..	94	—13	6.3	..	5.6	..
7	20,000	4-leg, undivided	130	199	..	53	62	76	..	23	1.6	1.5	..	..
15	8,200	4-leg, undivided	172	..	150	—13	134	..	74	—45	22.6	..	6.1	..
3	27,200	4-leg, divided	135	114	..	—16	118	29	..	—75	2.8	0	..	..
2	7,800	4-leg, divided	373	..	290	—22	280	..	157	—44	0	..	24.1	..
1	16,900	5- and 6-leg and other types	412	129	..	—69	471	81	..	—83	29.4	16.1	..	..
3	9,000	5- and 6-leg and other types	188	..	101	—46	150	..	92	—39	19.8	..	8.4	..
13	20,200	All types	153	182	..	19	117	67	..	—43	5.9	1.5	..	—75
25	8,000	All types	193	..	160	—17	143	..	87	—39	17.6	..	7.7	—56

[1]Too few data to compute percentage change for the different types of intersections.

Table 3.—Percentage change in the number of accidents and injuries per 100 million vehicles entering after installing traffic signals at 4-leg undivided intersections

Comparison	Average daily traffic	Type of signal installed	Percentage change after installing signal	
			Accident rate	Injury rate
4 intersections with lowest ADT	15,800	Stop-and-go	81	52
4 intersections with highest ADT	16,600	Flashing beacon	—7	—66
All 7 intersections	20,000	Stop-and-go	53	23
All 15 intersections	8,200	Flashing beacon	—13	—45

Table 4.—Number of accidents and injuries per 100 million vehicles entering before and after traffic signal installations at 38 intersections, grouped according to below average and above average daily traffic volumes

Number of intersections	Average daily traffic	Number of accidents per 100 million vehicles entering intersections				Number of injuries per 100 million vehicles entering intersections			
		Before signal installation	After installation of—			Before signal installation	After installation of—		
			Stop-and-go signal	Flashing beacon	Percentage change		Stop-and-go signal	Flashing beacon	Percentage change
8	Below 20,200	172	227	...	32	151	95	...	—37
5	Above 20,200	131	129	...	—2	77	34	...	—56
17	Below 8,000	285	...	223	—22	203	...	126	—38
8	Above 8,000	125	...	112	—10	98	...	56	—43
13	20,200	153	182	...	19	117	67	...	—43
25	8,000	193	...	160	—17	143	...	87	—39

were similar to those shown in table 1 for all 89 intersections. There is one important exception, however. In the case of flashing beacon installations, the percentage decrease in the number of accidents remained fairly constant for the 50 intersections reported in table 1, regardless of the type of intersection studied, but for the 25 intersections reported in table 2 the percentage decrease became progressively greater with intersection complexity. For stop-and-go signal installations, the relative changes in the number of accidents followed a similar trend in both tables 1 and 2. Whether the traffic volume factor is considered or not, it is immediately evident that stop-and-go signals are very effective in reducing accidents at the most complex types of intersections.

Traffic volumes at stop-and-go signal installations were on the average two or three times greater than the volumes at intersections having flashing beacons. In order to provide a meaningful comparison of the effectiveness of stop-and-go signals and flashing beacons, intersections with like traffic volumes were selected. Since four-leg undivided intersections predominated in the study, the comparison has been narrowed to this type in table 3. By grouping the 4 lowest traffic volume intersections having stop-and-go signals and the 4 highest volume intersections having flashing beacons, it was possible to select 2 groups of 4 intersections for which the average daily volumes approximated 16,000 vehicles.

The percentage change in accident and injury rates was computed for these eight intersections and for all four-leg undivided intersections (table 3). It is seen that installation of stop-and-go signals resulted in a substantial increase in the accident rate and a somewhat smaller increase in the injury rate. Flashing beacons, however, brought about a slight decline in the accident rate and a substantial decline in the injury rate. The pattern is the same whether the 8 intersections or all 22 intersections are compared.

In a further attempt to determine the effect of traffic volumes on accident rates, the stop-and-go controlled intersections and those with flashing beacons were each divided into two groups: intersections with traffic volumes below the average for the group and those above the average (table 4). Averages for the two groups were 20,200 ADT for stop-and-go signals, and 8,000 ADT for flashing beacons.

At stop-and-go controlled intersections, the accident rate increased 32 per cent at the 8 intersections with below-average traffic volumes, and decreased 2 per cent at the 5 intersections with above-average volumes. A similar comparison for flashing beacon installations showed a 22 per cent decrease in the accident rate for 17 intersections having below-average traffic volumes and a 10 per cent decrease for the 8 intersections with above-average volumes. Injury rates followed a declining trend, irrespective of traffic volumes or type of signal. Accident data reported in table 4 indicate that flashing beacons should be employed at low traffic volume intersections and stop-and-go signals at high volume intersections.

Traffic Signals Affect Types of Collisions

Types of collisions and the percentage change before and after installing stop-and-go signals and flashing beacons are reported in table 5 and illustrated in figure 3. Following installation of stop-and-go signals at 39 intersections, 3 types of collisions increased substantially: Rear-end collisions increased 200 per cent; head-on collisions, 157 per cent; and side-swipe collisions, 74 per cent. Only angle collisions and other miscellaneous accidents showed a decrease. The 50 intersections with flashing beacons presented an entirely different picture. All types of collisions declined, ranging from 18 per cent for rear-end collisions to 32 per cent for the head-on type.

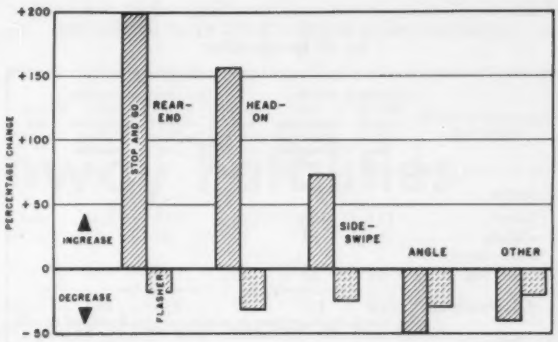

Figure 3—Percentage change in the number of accidents, by type of collision, after installation of traffic signals.

Table 5.—Number of accidents, by type of collision, before and after traffic signal installations at 89 intersections

Manner of Collision	Accidents before signal installation	Accidents after installing Stop-and-go signal	Percentage change	Accidents before signal installation	Accidents after installing flashing beacon	Percentage change
Rear-end	96	288	200	83	68	—18
Head-on	23	59	157	37	25	—32
Side-swipe	38	66	74	65	49	—25
Angle	259	128	—51	175	124	—29
Other	46	28	—39	42	33	[1]—21
All collisions	462	569	23	402	299	—26

[1]Percentage change is not statistically significant.

In the before period, angle collisions were dominant, but after installing stop-and-go signals, rear-end collisions ranked highest. However, after flashing beacons were installed, angle collisions still predominated, but there was a 29 per cent decline in the number.

Since stop-and-go signals tend to reduce angle collisions, it follows that where this type of accident is a substantial percentage of the total, stop-and-go signals are more likely to be effective. Traffic engineers in the past have used this criteria in deciding whether a traffic control signal should be installed at a particular intersection.

Light and Weather Conditions

Table 6 shows that after stop-and-go signals were installed, the number of accidents increased regardless of light or weather conditions, with the greatest increase occurring during periods of inclement weather. During daylight hours, such accidents increased 126 per cent as compared with an increase of only 32 per cent for all-weather conditions. Similarly, accidents occurring at night during inclement weather increased 41 per cent, as compared with an increase of only 11 per cent for all-weather conditions.

Table 6.—Number of accidents, according to light and weather conditions, before and after traffic signal installations at 89 intersections

Light and weather conditions	Accidents before signal installation	Accidents after installing Stop-and-go signal	Percentage change	Accidents before signal installation	Accidents after installing flashing beacon	Percentage change
Daytime:						
Clear	171	186	[1]9	132	110	—17
Cloudy	59	81	37	58	43	—26
Rain, snow, or fog	39	88	126	45	36	[1]—20
All conditions[2]	269	355	32	235	189	[1]—20
Nighttime:						
Clear	104	106	[1]2	91	63	—31
Cloudy	51	55	[1]8	34	15	—56
Rain, snow, or fog	34	48	41	32	27	[1]—16
All conditions[2]	189	209	11	157	105	—33

[1]Percentage change is not statistically significant.

[2]The number of accidents in this table are slightly less than those given in other tables because light and weather conditions were not known in every case.

With flashing beacons, the number of accidents decreased under all-weather conditions, both day and night. During daylight hours and inclement weather, the number decreased 20 per cent as compared with an identical decrease for all-weather conditions. At night and during inclement weather, the number of accidents decreased 16 per cent or about half as much as during all-weather conditions.

These comparisons point to the accident reduction benefit that can result from converting stop-and-go signals to flashing signals during inclement weather. More consideration should be given to this type of operation where signal controls are flexible enough to permit the conversion.

Established Policy on Traffic Control Devices

The Manual on Uniform Traffic Control Devices for Streets and Highways[2] provides that the total vehicular volume entering an intersection from all approaches must exceed 750 vehicles per hour for each of 8 hours of an average day in urban areas and 500 vehicles per hour for each of 8 hours of an average day in rural areas in order to justify stop-and-go signals. An equivalent 24-hour traffic volume to satisfy these conditions would probably be about 15,000 vehicles per day in urban areas and 10,000 vehicles per day in rural areas.

Table 4 shows that stop-and-go signals installed at these volumes have resulted in an increase in accident rates. Table 3 shows this even more strikingly for four-leg undivided highways. The 4 lowest volume stop-and-go intersections with an average daily traffic volume of 15,800 vehicles showed an increase of 81 per cent in the accident rate after the signals were installed. The injury rate also increased. By way of contrast, both tables show that installation of flashing devices at these low volumes resulted in decreases in both accident and injury rates. It seems apparent, therefore, that consideration should be given to greater use of flashing beacons at intersections that barely qualify for stop-and-go signals according to provisions of the manual. The manual does state that stop-and-go signals should be operated as flashing red and flashing yellow signals for the side street and main street, respectively, if the traffic volume falls below 50 per cent of the required minimums during two or more consecutive hours of the day. The present study provides additional support for this policy.

Throughout the article, the number of accidents, injuries, and fatalities have been expressed as a percentage relation of the experience before and after installing stop-and-go signals or flashing beacons. In order to test statistically the significance of the percentage changes that have occurred through modification of a highway intersection, two techniques have been developed by R. M. Michaels. His article titled *Two Simple Techniques for Determining the Significance of Accident-Reducing Measures* appears elsewhere in this issue.

In testing for significance, the investigator seeks to determine whether a percentage change of a given magnitude is great enough to be attributed to the change introduced (e.g., installation of a traffic signal) or whether it is due to chance.

The two methods developed by Michaels, one labeled as a liberal test and the other as a conservative test, are based on the chi-square and the Poisson distributions. To make use of Michaels' methods of evaluation, the reader should refer to his figure 1. The percentage changes in the number of accidents, injuries, and fatalities reported in the tables of this article may be compared with the two curves shown in figure 1 of Michaels' article. In doing so, it will be observed that the relative changes reported in the tables for frequencies of accidents and injuries are, for the most part, statistically significant, based on a 5 per cent probability level. In effect, this means that a percentage reduction in accidents of a given magnitude could not have occurred by chance more than once in 20 times. Percentage changes that are not considered statistically significant by either test are footnoted in the tables.

Recommendations

While more precise and complete information is needed to determine the conditions under which stop-and-go signals or flashing beacons may be most effective, the data presented here indicate that more widespread use of flashing beacons would be desirable at the simpler types of intersections.

A general and large-scale study of the relation between various design features of intersections and accidents should be undertaken to determine what type of traffic control device should be employed at a given intersection that would not only aid the movement of traffic but also provide maximum safety.

Flashing signal operation of certain stop-and-go signals during inclement weather seems to offer a possible method for reducing accidents. In determining when such signal operation should be used, the intersection accident and capacity factors should be fully considered.

[2]Published by the Public Roads Administration, Washington, 1948 (also 1954 revisions supplement).

Alcohol and Highway Fatalities

State medical examiners study highway victims to determine role of alcohol consumption as cause of death

by Henry C. Freimuth,

by Spencer R. Watts,

and Russell S. Fisher

Numerous studies have been published throughout the years relating the effects of alcohol consumption on the driving ability of motorists. Such studies have been reported by Smith and Pouham (1), Holcomb (2), Lucas et al. (3), Bjerver et al. (4) and Heise (5). The effect of alcohol on the pedestrian in traffic accidents has been reported by Gonzales and Gettler (6). The annual reports of the Department of Post Mortem Examiners of the State of Maryland have included information on the incidence of alcoholism in highway fatalities each year since 1949. However, with these exceptions, the literature is noticeably lacking in any comprehensive study relating alcohol consumption to highway deaths. It is for this reason that the present study was undertaken.

In the routine work of the Medical Examiner's Office, it is our custom to obtain samples of brain, spinal fluid or blood from victims of highway casualties who die within twelve hours of their fatal injury. These samples are then analyzed for their alcohol content in order to determine what role, if any, alcohol consumption may have had in causing the deaths. We have compiled the data so obtained from 500 consecutive highway fatalities in the City of Baltimore. Only 79 of the total cases survived more than three hours, 45 more than six hours and 20 more than nine hours after the fatal injury. These deaths occurred from January 1, 1951 through April, 1956.

The data on drivers are shown in Tables I and Ia. Of all the drivers tested, 58, or 37.2 per cent of the total, had alcohol concentrations in excess of 0.15 per cent. This

TABLE I
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY — 1951-1956
DRIVERS, WHITE TOTAL CASES—131
ALCOHOL CONCENTRATION

Age Groups	Neg.	0.01% to 0.04%	0.05% to 0.14%	0.15% to 0.24%	0.25% to 0.39%
10-19	8	1	2	1	0
20-29	6	2	10	13	2
30-39	12	1	7	8	4
40-49	8	0	4	7	3
50-59	7	0	4	5	1
60-69	2	0	0	0	2
70-79	1	1	0	0	0
TOTALS	44	5	27	34	12

Of nine white female drivers, only one had alcohol in the range 0.15 per cent to 0.24 per cent. She was in the 30-39 age group. The remaining eight women had no alcohol.

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is the concentration which is generally accepted as indicating that a subject having such a concentration should be considered to be "under the influence" of alcohol. One striking fact brought out by a study of the age break-down is that 39 of the 58 persons who were under the influence of alcohol or drunk were below the age of 40 while 22 of the total of 58 were below 30 years of age.

It is also interesting to note the comparatively low incidence of excessive alcohol consumption among the women drivers who were killed in comparison to the males. Only two of 11 females, or 18.1 per cent, were under the influence of alcohol in contrast to 56 out of 145 males, or 38.6 per cent.

If we add to the total number of drivers considered to be under the influence of alcohol those with alcohol concentrations in the range of 0.05 per cent to 0.14 per cent, we must consider an additional 33 individuals who possibly may have been affected by the alcohol which they consumed prior to death.

TABLE Ia
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY — 1951-1956
DRIVERS, COLORED TOTAL CASES—25
ALCOHOL CONCENTRATION

Age Groups	Neg.	0.01% to 0.04%	0.05% to 0.14%	0.15% to 0.24%	0.25% to 0.39%
10-19	0	0	0	0	0
20-29	0	1	3	5	0
30-39	2	0	3	3	1
40-49	2	0	0	1	0
50-59	1	0	0	0	0
60-69	0	0	0	0	0
70-79	1	0	0	0	0
TOTALS	6	1	6	9	1

Among colored female drivers there are only two (2) cases. One (1) in the 10-19 age group, having a 0.15 per cent to 0.24 per cent concentration and one (1) in the 30-39 age group, having no alcohol.

Tables II and IIa show the distribution of alcohol findings in passengers in motor vehicles who were killed in accidents. Of the 137 victims of such accidents, 36 or 26.3 per cent of the total were under the influence of alcohol or drunk with an additional 23 in the category in which they may possibly have been under the influence. Twenty nine of the 36 considered to be under the influence were below the age of 40 while 19 were below 30 years of age. It is, of course, difficult to assess the significance of excessive alcohol consumption as a causative factor in motor vehicle passenger deaths. However, many of these persons undoubtedly reflect the condition of the driver of the vehicle in which they were being conveyed at the time of death. This is indicated by the fact that a number of these persons were killed in accidents in which their vehicle driver, also under the influence of alcohol, was likewise killed. It is also possible that an intoxicated passenger may offer sufficient distraction to a sober driver to cause the latter to have an accident in which the passenger is killed. This, it is true, is speculative and not subject to accurate estimation.

TABLE IIa
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY — 1951-1956
PASSENGERS, COLORED TOTAL CASES—37
ALCOHOL CONCENTRATION

Age Groups	Neg.		0.01% to 0.04%		0.05% to 0.14%		0.15% to 0.24%		0.25% to 0.39%	
	Male	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*
10-19	0	0	0	0	1	0	0	2	0	0
20-29	1	3	2	0	3	1	5	1	1	0
30-39	1	0	1	0	0	1	1	1	3	0
40-49	1	2	0	0	0	0	1	0	0	0
50-59	1	1	0	0	0	0	0	0	1	0
60-69	1	1	0	0	0	0	0	0	0	0
70-79	0	0	0	0	0	0	0	0	0	0
TOTALS	5	7	3	0	4	2	7	4	5	0

TABLE II
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY — 1951-1956
PASSENGERS, WHITE TOTAL CASES—100
ALCOHOL CONCENTRATION

Age Groups	Neg.		0.01% to 0.04%		0.05% to 0.14%		0.15% to 0.24%		0.25% to 0.39%	
	Male	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*
10-19	6	4	1	0	3	1	2	1	1	0
20-29	6	10	3	0	5	2	2	1	3	0
30-39	3	4	1	0	3	2	3	0	1	1
40-49	4	3	0	0	0	0	1	1	1	0
50-59	7	2	0	0	1	0	0	0	0	0
60-69	3	5	0	0	0	0	0	0	0	0
70-79	0	1	0	0	0	0	2	0	0	0
TOTALS	29	29	5	0	12	5	10	3	6	1

TABLE III
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY—1951-1956
PEDESTRIANS, WHITE TOTAL CASES—151
ALCOHOL CONCENTRATION

Age Groups	Neg.		0.01% to 0.04%		0.05% to 0.14%		0.15% to 0.24%		0.25% to 0.39%	
	Male	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*
10-19	4	1	0	0	0	0	0	0	0	0
20-29	4	1	0	0	1	0	4	0	0	0
30-39	2	3	2	0	5	0	3	1	3	0
40-49	3	3	0	0	3	0	4	0	4	0
50-59	14	4	0	1	0	1	0	1	4	0
60-69	8	12	0	0	6	0	8	0	2	0
70-79	18	10	2	0	6	0	3	0	0	0
TOTALS	53	34	4	1	21	1	22	2	13	0

The data on the deaths of pedestrians caused by motor vehicles are shown in Tables III and IIIa. These lend added emphasis to the recently expressed observation (7) on the greater danger faced by the pedestrian in our larger cities than by the motorist, primarily due to misconduct on the part of the former. In this connection, the statistics of the Medical Examiner's Office of Maryland show, for the period 1951 to 1955 inclusive, that 503 of a total of 964 motor vehicle fatalities in the City of Baltimore were pedestrians. This is 52 per cent of the total highway casualties!

TABLE IIIa
ALCOHOL AND HIGHWAY FATALITIES IN BALTIMORE CITY—1951-1956
PEDESTRIANS, COLORED TOTAL CASES—56
ALCOHOL CONCENTRATION

Age Groups	Neg.		0.01% to 0.04%		0.05% to 0.14%		0.15% to 0.24%		0.25% to 0.39%		0.40% and up	
	Male	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*	*Male*	*Fem.*
10-19..	1	0	0	0	1	0	0	0	0	0	0	0
20-29..	0	0	1	0	0	0	1	0	0	0	0	0
30-39..	0	1	0	0	0	0	3	0	4	0	0	0
40-49..	3	1	1	0	0	1	6	0	2	0	1	0
50-59..	3	2	0	0	2	1	5	0	2	0	0	0
60-69..	2	1	1	0	0	0	1	0	2	0	0	0
70-79..	5	2	0	0	0	0	0	0	0	0	0	0
Totals .	14	7	3	0	3	2	16	0	10	0	1	0

Sixty-four of the 207 pedestrians, or 30.9 per cent of those shown in Tables III and IIIa, were under the influence of alcohol or drunk. In addition, another 27 were in the zone of alcohol concentration in which they may have been under the influence. Only two women pedestrians were shown to be under the influence as compared to 62 males. This is in keeping with the general observation that it is relatively rare to see an intoxicated woman on our city streets but fairly common to see a man in this condition.

Another point worthy of comment is that 45 of the 64 pedestrians who had "looked upon the grape when it was ripe" were above the age of 40 while 28 were above 50 years of age. This is a reversal of the picture seen in the drivers described above and is illustrated in Figure I. Here we have persons who have already had their reactions slowed as a result of advancing years and have simply heaped "coals of fire" upon their heads by excessive consumption of alcohol. Apparently, we must modify the slogan "If you drink, don't drive" to include the words "and don't walk, either."

Summary and Conclusions

A study of 500 motor vehicle fatalities in Baltimore City in which the victims died within 12 hours of their injury shows:

(1) Fifty-eight or 37.2 per cent of a total of 156 drivers killed in accidents were under the influence of alcohol or drunk at the time of death. An additional 33 drivers had sufficient alcohol in their tissues to indicate that they may have been adversely affected. Thirty-nine, or 67 per cent, of those under the influence were below the age of 40 with 22 under 30 years of age.

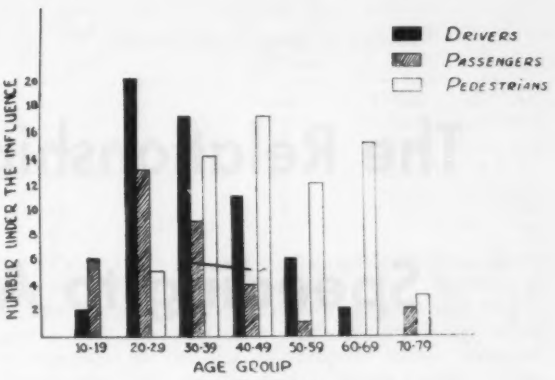

Figure 1

(2) Thirty-six of 137 passengers, or 26.3 per cent, were under the influence of alcohol or drunk with 23 more being possibly under the influence. Twenty-nine, or 80.6 per cent, of those under the influence were under 40 years of age and 19, or 52.8 per cent, were below the age of 30.

(3) Of 207 pedestrians, 64 were under the influence of alcohol or drunk. This is 30.9 per cent of the total. Twenty-seven other pedestrians may possibly have been under the influence. Forty-five of the 64 who were definitely affected were older than 40 years, while 28 were above the age of 50. This is 70.3 per cent and 43.7 per cent respectively.

(4) Of the total of 500 cases, 158 persons were under the influence of alcohol or drunk with 83 more in the range where their alcohol consumption may be considered as probably being a contributory factor to the accident in which they lost their lives. The 241 cases listed represents 48.2 per cent of the total 500 in which alcohol consumption may be deemed to be a causative factor.

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The Relationship of Drinking and Speeding to Accident Severity

The tables accompanying this narrative show the relationship of drinking and speeding to accident severity for rural accidents and urban accidents. The tables are further divided to show age and sex information.

The purpose of this study was to determine if possible, whether or not drinking or speeding are more characteristic of one sex or one age group, and secondly whether any relationship exists between drinking or speeding and the severity of the accident.

The entire study covers 69,289 drivers, 59,334 or 85 per cent of whom were males and 9,955 or 15 per cent female drivers, and is based on accident data taken from 1958 officer reported accidents. In Minnesota women drivers number approximately 563,500 or 32 per cent of the licensed drivers, while men drivers number approximately 1,186,500 or 68 per cent of Minnesota's licensed drivers. The National Safety Council suggests that the average mileage per driver approximates 8,100 miles per year and women drivers drive about 3,000 miles per year. In Minnesota we know that the average mileage per passenger automobile, based on gasoline consumption of 14.6 miles per gallon, is about 8,500 miles per year. No data are available on the average miles driven by men and women drivers in Minnesota.

Of the 69,289 drivers, 15,516 were involved in accidents occurring on rural roads or highways, and 53,773 were involved in accidents on urban roads. The following table shows the percentage of drivers, both men and women, who were involved in accidents and had been drinking, divided by the number of accidents in each accident severity.

TABLE I

Drinking Compared to Severity
(In per cents)

	Had Been Drinking	Had Not Been Drinking	Drinking Not Stated
Fatal	22.6	49.3	28.1
Non-Fatal	10.3	68.5	21.1
Property Damage	7.2	69.9	22.9
All	8.4	69.2	22.4

This report was prepared in the office of the safety director of the Minnesota Department of Highways.

The following table shows the percentage of drivers of both sexes, who were involved in accidents and who had been speeding.

TABLE II

Speed Compared to Severity
(In per cents)

	Speed	Not Speeding or Not Stated
Fatal	23.0	77.0
Non-Fatal	11.4	88.6
Property Damage	7.4	92.6
All	8.9	91.1

It is readily apparent that the drivers who had been drinking and drivers who had been exceeding posted speed limits or who had been driving in excess of a safe speed for road and weather conditions showed up in greater percentage concentrations as the degree or severity of the accident increased. By severity we mean the type of accident based on its seriousness:

1. Fatal Accident—An accident in which one or more persons are killed, which may also be accompanied by personal injury to one or more persons, and/or property damage.

2. Non-Fatal Accident—An accident in which no human is killed, but in which one or more humans are injured and this may be accompanied by property damage.

3. Property Damage—An accident in which no human is killed or injured, but in which some property is damaged.

Percentages of drivers who had been drinking, and drivers who had been speeding, bear a striking resemblance to each other in each of the accident severities. The percentage of drivers drinking and speeding increases in proportion to the severity of the accident. Drivers who had been drinking and drivers who had been speeding are involved in 1½ times as many personal injury or non-fatal type accidents and 3 times as many fatal as property damage accidents. The drinking figures adjusted for the two sexes show that in all accidents 308 or 3 per cent of the women drivers had been drinking, but that 5,541 or 9 per cent of the men had been drinking. This indicated that alcohol

is involved in an accident 3 times as often when men are driving as when women are driving. The following table indicates the difference in drinking by type of accident, sex and location of accident.

TABLE III

Drinking in Rural and Urban Accidents
(In per cents)

	MEN			WOMEN		
	Rural	Urban	All	Rural	Urban	All
Fatal	25.9	17.6	23.70	11.7	13.3	12.00
Non-Fatal	16.3	9.6	11.60	5.2	3.6	3.96
Property Damage	11.2	7.7	7.96	2.2	2.5	2.40

These percentages of drivers who had been drinking were computed using the number of drivers by sex, severity of accident, and location divided by the total number of drivers male or female in the severity class. It is apparent that in the case of men drivers, the drinking factor occurs more often in drivers involved in accidents on rural roads than for drivers involved in accidents on urban roads.

This same experience is not found in the record of women drivers who had been drinking and then were involved in accidents. In Table III it can be seen that women drivers in the fatal and property damage severities had been drinking more often when involved in urban accidents than when they were involved in rural accidents. Information for Table III is taken from Tables VII through X.

An examination of the drivers who had been speeding leads to the construction of the following table.

TABLE IV

Speeding in Rural and Urban Accidents
(In per cents)

	MEN			WOMEN		
	Rural	Urban	All	Rural	Urban	All
Fatal	23.2	22.4	23.0	21.6	26.6	22.7
Non-Fatal	19.7	8.9	12.0	14.7	6.7	8.5
Property Damage	12.2	6.7	7.7	8.3	4.5	5.1

This table was constructed in the same manner as Table III and is based on information from Tables XI through XIV. Here too we see that in the case of men drivers, speeding occurred in a higher percentage of rural accidents than in urban accidents; the overall average of the speeding factor being more than twice as high in the case of drivers involved in rural accidents as those involved in urban accidents. The same characteristics are apparent in the table describing the speeding factor associated with women drivers involved in accidents with the exception of the presence of speeding in fatal accidents where 5 per cent more women were speeding prior to being a party to a fatal accident in urban areas.

TABLE V

Rural-Urban Speed Violations
(In per cents)

	Rural	Urban	All
Fatal	17.2	5.8	23.0
Non-Fatal	5.2	6.2	11.4
Property Damage	2.2	5.1	7.4
Total	3.4	5.5	8.9

In Table V the percentage of speeding violations as related to rural and urban accidents is shown. Speeding as a factor in all rural fatal accidents is three times higher than it is in urban accidents. This picture changes when one considers the non-fatal and property damage severities, for the table indicates that slightly higher speeding violations are found in the urban road accidents. However, 75 per cent of all accidents are either non-fatal or property damage, and this heavily influences the unweighted average of 5.5 for all urban accidents and 3.4 for all rural accidents.

TABLE VI

Drinking in Rural and Urban Accidents
(In per cents)

	Rural	Urban	All
Fatal	18.2	4.4	22.6
Non-Fatal	4.1	6.2	10.3
Property Damage	1.9	5.3	7.2
All	2.8	5.6	8.4

The experience shown in the above table parallels that of the table on speeding in general tendencies, however the differences within each severity of accident are more marked as between those occurring on rural and urban roads. Four times as many drivers involved in fatal accidents in rural areas had been drinking as drivers involved in fatal accidents in urban areas. There were 1½ times as many drivers who had been drinking involved in non-fatal accidents in urban areas as in rural areas, and nearly three times as many drivers who had been drinking were involved in property damage accidents in urban areas as those involved in property damage accidents in rural areas.

Table VII shows severity data for drivers who had been drinking compared to age of male drivers involved in accidents in rural areas, and Table VIII, the same information for male drivers involved in accidents in urban areas. Table IX is a frequency distribution of the same data for female drivers. Table X portrays data of accidents that happened in urban areas where women drivers had been drinking.

In Table XV the drivers who had been drinking are listed by age groups and then divided by sex and the place where the accident in which the drivers were involved occurred. In order to make the table comparable the number of drivers in each age group has been converted into a percentage of the total drivers in the particular group. Another column shows the percentage of drivers in each age group using the total drivers drinking as a base. Table XVI is constructed in the same way except that it indicates the percentage of drivers who had been speeding.

Under Minnesota law it is illegal for a person under 21 to purchase, have in his possession, or consume an intoxicating liquor. None the less, 14 per cent of all the drivers in fatal accidents who had been drinking were under 21 years of age and 7 per cent were 18 years of age and under. The 21-25 year group showed the greatest concentration of drivers who had been drinking, with 19.1 per cent of all drinking drivers falling into that group. By way of comparison, approximately 10 per cent of Minnesota driving population is in this 21-25 age group.

Table XVI which deals with drivers who had been speeding indicates that 49.6 per cent of the drivers who had been speeding were 25 or younger. Approximately 18 per cent of Minnesota's driving population is under 26 years of age, which leads us to conclude that younger drivers, those under 26, are guilty of speeding nearly three times as often in accidents as would be expected based on their ration to the driving population. Since this same group was involved in 33 per cent of the officer reported accidents, the evidence of speeding was 1.5 times more frequent than their participation in officer reported accidents. And their inclusion in these accident statistics is 3 times greater than it should be based on their representation in Minnesota's driving population.

Based on the information obtained in this study we can say with positive assurance that the severity of the accident increases in proportion to the incidence of drinking and speeding; that 43 per cent more drinking occurred in non-fatal accidents and *213* per cent more drinking in fatal accidents than in property damage accidents. In the case of speed there were 54 per cent more drivers speeding in non-fatal accidents and *210* per cent more drivers speeding in fatal accidents than in property damage accidents.

Drinking drivers are found three times as often among the male drivers covered by this study in each of the two lower severity types of accident, but just under twice as frequently in the case of fatal accidents.

The three to one disparity between male and female drivers who had been drinking is not quite as prominent in the case of drivers who had been speeding. The male drivers exceed female drivers in this situation by only 1½ to one.

In summarizing drinking and speeding according to the age of drivers, we find the finger of guilt pointing toward our younger drivers. Nearly 30 per cent of the drinking drivers were 25 and under and almost 50 per cent of the speeding violations arose as a result of this same group's poor driving behavior. These violations were caused by drivers in an age group that represents less than 20 per cent of our driving population.

TABLE VII

Driver Drinking in Rural Traffic Accidents (Males)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Had been drinking	1	2	..	1	5	8	4	24	22	12	12	27	10	8	..	1	137
Had not been drinking	3	4	7	8	10	4	3	44	19	19	15	42	27	17	22	..	244
Drinking not stated	6	4	1	2	7	4	5	22	20	10	18	20	10	8	8	3	148
Total drivers	**10**	**10**	**8**	**11**	**22**	**16**	**12**	**90**	**61**	**41**	**45**	**89**	**47**	**33**	**30**	**4**	**529**
Non-Fatal Accidents																	
Had been drinking	..	..	5	18	13	32	41	224	136	108	76	128	68	37	10	13	909
Had not been drinking	9	58	111	160	150	145	110	479	360	323	263	467	391	316	158	26	3526
Drinking not stated	7	15	39	53	58	42	45	178	99	107	94	144	113	77	34	25	1130
Total drivers	**16**	**73**	**155**	**231**	**221**	**219**	**196**	**881**	**595**	**538**	**433**	**739**	**572**	**430**	**202**	**64**	**5565**
Property Damage																	
Had been drinking	1	..	1	14	23	20	31	157	115	105	83	133	85	47	10	11	842
Had not been drinking	11	66	189	223	217	168	184	704	511	427	387	683	550	394	204	67	4985
Drinking not stated	6	42	66	83	74	77	67	262	155	136	118	191	169	115	69	76	1706
Total drivers	**18**	**108**	**262**	**320**	**314**	**265**	**282**	**1123**	**781**	**668**	**588**	**1007**	**804**	**556**	**283**	**154**	**7533**
ALL RURAL																	
Had been drinking	2	2	12	33	41	60	76	405	273	225	171	288	163	92	20	25	1888
Had not been drinking	23	128	307	391	377	317	297	1227	890	769	665	1192	968	727	384	93	8755
Drinking not stated	19	61	106	138	139	123	117	462	274	253	230	355	292	200	111	104	2984
TOTAL DRIVERS	**44**	**191**	**425**	**562**	**557**	**500**	**490**	**2094**	**1437**	**1247**	**1066**	**1835**	**1423**	**1019**	**515**	**222**	**13627**

TABLE VIII
Driver Drinking in Urban Traffic Accidents (Males)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Had been drinking	..	..	..	2	..	..	1	7	5	6	3	4	3	2	..	..	33
Had not been drinking	..	..	2	4	7	3	3	15	11	11	10	14	8	9	6	..	103
Drinking not stated	1	..	1	1	1	1	2	10	8	7	2	5	3	4	3	2	51
Total drivers	**1**	**..**	**3**	**7**	**8**	**4**	**6**	**32**	**24**	**24**	**15**	**23**	**14**	**15**	**9**	**2**	**187**
Non-Fatal Accidents																	
Had not been drinking	9	159	271	377	367	352	310	269	192	190	164	227	117	54	7	25	1347
Had been drinking	..	2	8	14	10	37	31	1390	1134	1001	868	1344	952	665	249	148	9596
Drinking not stated	3	40	82	130	114	109	99	451	344	268	263	406	308	196	75	105	2993
Total drivers	**12**	**201**	**361**	**521**	**491**	**498**	**440**	**2110**	**1670**	**1459**	**1295**	**1977**	**1377**	**915**	**331**	**278**	**13936**
Property Damage																	
Had been drinking	1	5	11	22	35	31	44	402	299	274	251	393	266	127	30	82	2273
Had not been drinking	19	341	705	937	979	854	786	3423	2618	2160	1816	2833	2044	1483	603	430	22031
Drinking not stated	8	108	251	304	262	254	270	1107	801	684	578	952	668	477	109	366	7280
Total drivers	**28**	**454**	**967**	**1263**	**1276**	**1139**	**1100**	**4932**	**3718**	**3118**	**2645**	**4178**	**2978**	**2087**	**823**	**878**	**31584**
ALL URBAN																	
Had been drinking	1	7	19	38	45	68	76	678	496	470	418	624	386	183	37	107	3653
Had not been drinking	28	500	978	1318	1353	1209	1099	4828	3763	3172	2694	4191	3004	2157	858	578	31730
Drinking not stated	12	148	334	435	377	364	371	1568	1153	959	843	1363	979	677	268	473	10324
TOTAL DRIVERS	**41**	**655**	**1331**	**1791**	**1775**	**1641**	**1546**	**7074**	**5412**	**4601**	**3955**	**6178**	**4369**	**3017**	**1163**	**1158**	**45707**

Source: Accident Records—Minnesota Department of Highways

TABLE IX
Driver Drinking in Rural Traffic Accidents (Females)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Had been drinking	..	..	..	1	..	..	..	1	..	1	1	1	2	..	..	..	7
Had not been drinking	1	2	..	5	1	1	1	5	4	3	1	3	3	1	2	..	33
Drinking not stated	..	..	..	1	..	..	..	..	3	3	2	2	5	3	1	..	20
Total drivers	**1**	**2**	**..**	**7**	**1**	**1**	**1**	**6**	**7**	**7**	**4**	**6**	**10**	**4**	**3**	**..**	**60**
Non-Fatal Accidents																	
Had been drinking	..	..	1	1	1	1	3	6	10	4	5	8	3	2	..	..	45
Had not been drinking	1	11	25	29	26	24	18	76	63	71	60	106	84	39	5	3	641
Drinking not stated	..	7	6	3	7	11	2	35	15	16	19	29	17	8	..	1	176
Total drivers	**1**	**18**	**32**	**33**	**34**	**36**	**23**	**117**	**88**	**91**	**84**	**143**	**104**	**49**	**5**	**4**	**862**
Property Damage																	
Had been drinking	..	..	..	..	..	1	1	6	3	1	1	4	3	..	..	1	21
Had not been drinking	2	14	36	33	41	22	22	100	62	77	64	121	73	41	8	9	725
Drinking not stated	..	7	10	11	10	9	9	23	23	28	26	28	22	9	1	5	221
Total drivers	**2**	**21**	**46**	**44**	**51**	**32**	**32**	**129**	**88**	**106**	**91**	**153**	**98**	**50**	**9**	**15**	**967**
ALL RURAL																	
Had been drinking	..	..	1	2	1	2	4	13	13	6	7	13	8	2	..	1	73
Had not been drinking	4	27	61	67	68	47	41	181	129	151	125	230	160	81	15	12	1399
Drinking not stated	..	14	16	15	17	20	11	58	41	47	47	59	44	20	2	6	417
TOTAL DRIVERS	**4**	**41**	**78**	**84**	**86**	**69**	**56**	**252**	**183**	**204**	**179**	**302**	**212**	**103**	**17**	**19**	**1889**

TABLE X
Driver Drinking in Urban Traffic Accidents (Females)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Had been drinking	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	2
Had not been drinking	..	..	1	..	..	..	1	1	1	3	1	..	1	1	..	..	10
Drinking not stated	..	..	..	..	..	1	..	1	..	..	..	1	..	..	..	..	3
Total drivers	..	..	1	..	..	1	1	3	1	3	1	2	1	1	..	..	15
Non-Fatal Accidents																	
Had been drinking	..	..	..	..	2	2	5	13	19	18	16	18	11	1	..	1	106
Had not been drinking	1	25	64	91	84	72	63	264	240	245	229	394	236	141	32	30	2211
Drinking not stated	1	7	7	26	17	13	18	62	76	77	75	119	65	37	12	14	626
Total drivers	2	32	71	117	103	87	86	339	335	340	320	531	312	179	44	45	2943
Property Damage																	
Had been drinking	2	..	1	1	1	2	2	15	12	26	18	24	15	3	1	4	127
Had not been drinking	6	73	123	153	132	141	141	482	420	422	373	622	400	216	54	66	3824
Drinking not stated	..	20	41	44	41	35	44	157	128	106	111	192	120	54	13	51	1157
Total drivers	8	93	165	198	174	178	187	654	560	554	502	838	535	273	68	121	5108
ALL URBAN																	
Had been drinking	2	..	1	1	3	4	7	29	31	44	34	43	26	4	1	5	235
Had not been drinking	7	98	188	244	216	213	205	747	661	670	603	1016	637	358	86	96	6045
Drinking not stated	1	27	48	70	58	49	62	220	204	183	186	312	185	91	25	65	1786
TOTAL DRIVERS	10	125	237	315	277	266	274	996	896	897	823	1371	848	453	112	166	8066

Source: Accident Records—Minnesota Department of Highways

TABLE XI
Speeding Drivers in Rural Traffic Accidents (Males)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Speeding	5	3	2	2	7	7	4	24	19	6	11	19	6	3	3	2	123
Not speeding and not stated	5	7	6	9	15	9	8	66	42	35	34	70	41	30	27	2	406
Total drivers	10	10	8	11	22	16	12	90	45	41	45	89	47	33	30	4	529
Non-Fatal Accidents																	
Speeding	3	19	55	60	64	83	62	255	116	107	66	94	42	42	12	17	1097
Not speeding and not stated	13	54	100	171	157	136	134	626	479	431	367	645	530	388	190	47	4468
Total drivers	16	73	155	231	221	219	196	881	595	538	433	739	572	430	202	64	5565
Property Damage																	
Speeding	3	17	59	64	61	41	50	178	125	67	60	86	55	23	10	23	922
Not speeding and not stated	15	91	203	256	253	224	232	945	656	601	528	921	749	533	273	131	6611
Total drivers	18	108	262	320	314	265	282	1123	781	668	588	1007	804	556	283	154	7533
ALL RURAL																	
Speeding	11	39	116	126	132	131	116	457	260	180	137	199	103	68	25	42	2142
Not speeding and not stated	33	152	309	436	425	369	374	1637	1177	1067	929	1636	1320	951	490	180	11485
TOTAL DRIVERS	44	191	425	562	557	500	490	2094	1437	1247	1066	1835	1423	1019	515	222	13627

TABLE XII

Speeding Drivers in Urban Traffic Accidents (Males)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Speeding	..	..	1	3	1	2	1	9	7	5	1	4	3	3	2	..	42
Not speeding and not stated	1	..	2	4	7	2	5	23	17	19	14	19	11	12	7	2	145
Total drivers	**1**	**..**	**3**	**7**	**8**	**4**	**6**	**32**	**24**	**24**	**15**	**23**	**14**	**15**	**9**	**2**	**187**
Non-Fatal Accidents																	
Speeding	2	35	55	80	68	69	65	255	150	115	98	108	74	40	9	20	1243
Not speeding and not stated	10	166	306	441	423	429	375	1855	1520	1344	1197	1869	1303	875	322	258	12693
Total drivers	**12**	**201**	**361**	**521**	**491**	**498**	**440**	**2110**	**1670**	**1459**	**1295**	**1977**	**1377**	**915**	**331**	**278**	**13936**
Property Damage																	
Speeding	7	56	92	123	113	123	105	402	255	208	149	189	129	83	26	53	2113
Not speeding and not stated	21	398	875	1140	1163	1016	995	4530	3463	2910	3989	3989	2849	2004	797	825	29471
Total drivers	**28**	**454**	**967**	**1263**	**1276**	**1139**	**1100**	**4932**	**3718**	**3118**	**2645**	**4178**	**2978**	**2087**	**823**	**878**	**31584**
ALL URBAN																	
Speeding	9	91	148	206	182	194	171	666	412	328	248	301	206	126	37	73	3398
Not speeding and not stated	32	564	1183	1585	1593	1447	1375	6408	5000	4273	3707	5877	4163	2891	1126	1085	42309
TOTAL DRIVERS	**41**	**655**	**1331**	**1791**	**1775**	**1641**	**1546**	**7074**	**5412**	**4601**	**3955**	**6178**	**4369**	**3017**	**1163**	**1158**	**45707**

Source: Accident Records—Minnesota Department of Highways

TABLE XIII

Speeding Drivers in Rural Traffic Accidents (Females)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Speeding	..	1	..	2	..	1	..	3	1	..	2	1	2	..	..	..	13
Not speeding and not stated	1	1	..	5	1	..	1	3	6	7	2	5	8	4	3	..	47
Total drivers	**1**	**2**	**..**	**7**	**1**	**1**	**1**	**6**	**7**	**7**	**4**	**6**	**10**	**4**	**3**	**..**	**60**
Non-Fatal Accidents																	
Speeding	..	13	7	7	9	5	3	15	12	7	11	17	13	5	1	2	127
Not speeding and not stated	1	5	25	26	25	31	20	102	76	84	73	126	91	44	4	2	735
Total drivers	**1**	**18**	**32**	**33**	**34**	**36**	**23**	**117**	**88**	**91**	**84**	**143**	**104**	**49**	**5**	**4**	**862**
Property Damage																	
Speeding	1	4	5	1	4	3	6	18	9	4	1	10	9	2	..	3	80
Not speeding and not stated	1	17	41	43	47	29	26	111	79	102	90	143	89	48	9	12	887
Total drivers	**2**	**21**	**46**	**44**	**51**	**32**	**32**	**129**	**88**	**106**	**91**	**153**	**98**	**50**	**9**	**15**	**967**
ALL RURAL																	
Speeding	1	18	12	10	13	9	9	36	22	11	14	28	24	7	1	5	220
Not speeding and not stated	3	23	66	74	73	60	47	216	161	193	165	274	188	96	16	14	1669
TOTAL DRIVERS	**4**	**41**	**78**	**84**	**86**	**69**	**56**	**252**	**183**	**204**	**179**	**302**	**212**	**103**	**17**	**19**	**1889**

TABLE XIV

Speeding Drivers in Urban Traffic Accidents (Females)

Accident Severity	AGE OF DRIVER																
	14 and Under	15	16	17	18	19	20	21 Thru 25	26 Thru 30	31 Thru 35	36 Thru 40	41 Thru 50	51 Thru 60	61 Thru 70	71 and Over	Not Stated	Total
Fatal Accidents																	
Speeding	..	..	..	..	..	1	1	1	..	..	..	1	..	..	..	..	4
Not speeding and not stated	..	..	1	..	..	..	..	2	1	3	1	1	1	1	..	..	11
Total drivers	..	..	1	..	..	1	1	3	1	3	1	2	1	1	..	..	15
Non-Fatal Accidents																	
Speeding	1	3	14	18	4	4	5	32	17	18	22	31	16	9	1	2	197
Not speeding and not stated	1	29	57	99	99	83	81	307	318	322	298	500	296	170	43	43	2746
Total drivers	2	32	71	117	103	87	86	339	335	340	320	531	312	179	44	45	2943
Property Damage																	
Speeding	1	12	9	10	4	3	7	40	20	28	20	37	22	12	1	5	231
Not speeding and not stated	7	81	156	188	170	175	180	614	540	526	482	801	513	261	67	116	4877
Total drivers	8	93	165	198	174	178	187	654	560	554	502	838	535	273	68	121	5108
ALL URBAN																	
Speeding	2	15	23	28	8	8	13	73	37	46	42	69	38	21	2	7	432
Not speeding and not stated	8	110	214	287	269	258	261	923	859	851	781	1302	810	432	110	159	7634
TOTAL DRIVERS	10	125	237	315	277	266	274	996	896	897	823	1371	848	453	112	166	8066

Source: Accident Records—Minnesota Department of Highways

TABLE XV

Percentage of Drinking Drivers

Age Group	MALE		FEMALE		Total
	*Rural	Urban	*Rural	Urban	
14 and under	.1			.8	
15	.2	.2			.1
16	.6	.5	1.4	.4	.6
17	1.7	1.0	2.7	.4	1.3
18	2.2	1.2	1.4	1.3	1.5
19	3.2	1.8	2.7	1.7	2.3
20	4.0	2.1	5.5	3.0	2.8
21-25	21.4	18.5	17.8	12.4	19.2
26-30	14.5	13.6	17.8	13.2	13.9
31-35	11.9	12.9	8.2	18.7	12.7
36-40	9.1	11.5	9.6	14.5	10.8
41-50	15.3	17.1	17.8	18.3	16.6
51-60	8.6	10.6	11.0	11.1	10.0
61-70	4.9	5.0	2.7	1.7	4.8
71 and over	1.0	1.0		.4	1.0
Not stated	1.3	2.9	1.4	2.1	2.4

TABLE XVI

Percentage of Speeding Drivers

Age Group	MALE		FEMALE		Total
	*Rural	Urban	*Rural	Urban	
14 and under	.5	.2	.4	.4	.4
15	1.8	2.7	8.2	3.5	2.6
16	5.4	4.3	5.5	5.3	4.8
17	5.9	6.1	4.5	6.5	6.0
18	6.1	5.4	5.9	1.9	5.4
19	6.1	5.7	4.1	1.9	5.5
20	5.5	5.0	4.1	3.0	5.0
21-25	21.2	19.6	16.4	16.9	19.9
26-30	12.1	12.1	10.0	8.6	11.8
31-35	8.4	9.6	5.0	10.6	9.1
36-40	6.4	7.3	6.4	9.7	7.1
41-50	9.3	9.0	12.7	16.0	9.6
51-60	4.8	6.1	10.9	8.9	6.0
61-70	3.3	3.7	3.2	4.9	3.6
71 and over	1.2	1.1	.4	.4	1.0
Not stated	2.0	2.1	2.3	1.6	2.0

**Percentages in Tables are percentage of Total Drivers in each group.*

Source: Accident Records
Minnesota Department of Highways

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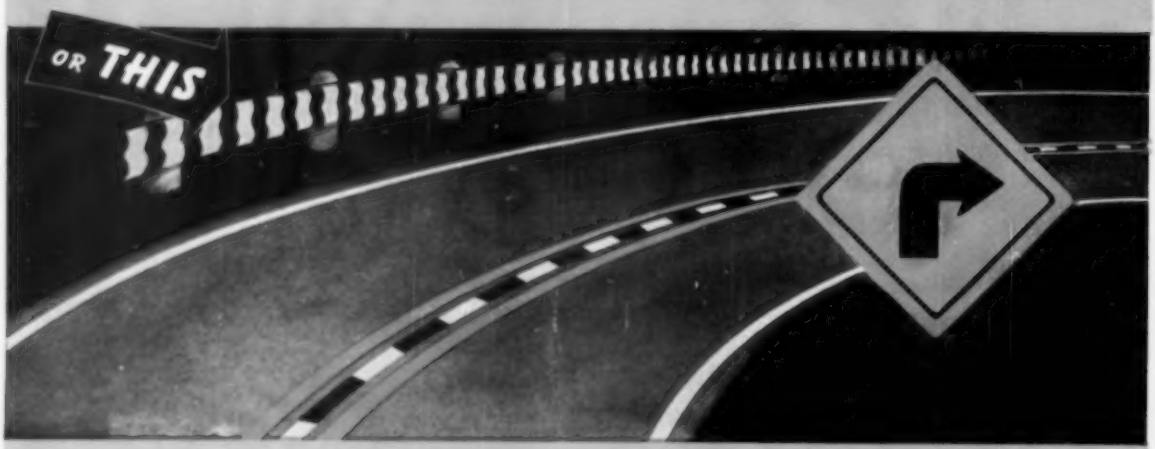

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